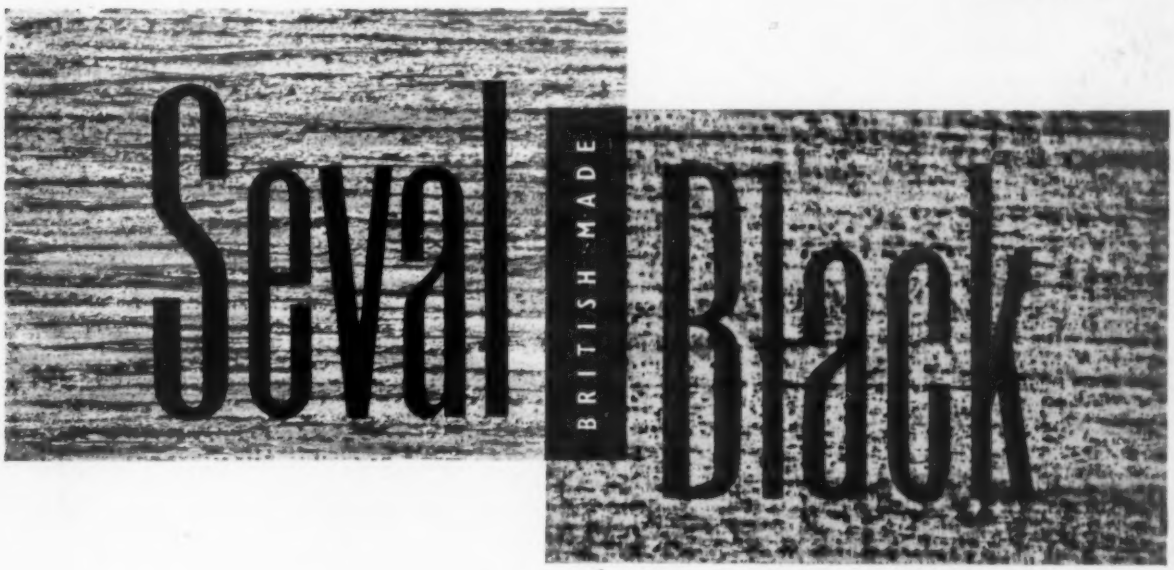
Rubber Journal and International Plastics

VOL. 138 NO. 14 APRIL 2 1960 Price 1s. Weekly



A medium thermal black for natural and synthetic rubbers, belting, hose, tyres, tubes, footwear, oil-resisting rubbers and high-grade mechanicals. Gives good flexing, high resilience, very easy processing, low heat build-up, and low modulus.

ANCHOR CHEMICAL COMPANY LTD – MANCHESTER 11

London Office: Grand Buildings, Trafalgar Square, W.C.2
Scottish Agents: J. & G. Hardie & Co. Ltd., 178 Fulton Street, Glasgow, W.3
American Liaison and Service Branch: British Anchor Chemical Corporation, 366 Madison Avenue, New York 17, N.Y.

Irish Tanners Limited use 'Butakon' Latex ML 590 on their hides

Above: A finish containing 'Butakon' Latex ML590 being sprayed on to a hide.
Below: The final process of plating to give the hide a high gloss after finishing with 'Butakon' Latex ML590.
Both photographs taken at Irish Tanners Limited, Portlaw, Co. Waterford, Eire.

'Butakon' Latex ML590 is the new I.C.I. resin dispersion which is finding enthusiastic acceptance in the leather industry. Irish Tanners Limited are among the many companies successfully using it.

Easy to apply to leather by pad or spray-gun, 'Butakon' Latex ML590 will give finishes showing excellent fastness to wet rub, high gloss without tack, good flexibility at low temperatures, non-yellowing in white and pastel shades, and good ageing properties.

'Butakon' Latex ML590 is backed by the full resources of I.C.I.'s Research and Technical Service. If there is anything you want to know about this new, low cost resin dispersion, its uses and advantages, please enquire from your nearest I.C.I. sales office.

'Butakon'

'Butakon' is the registered trade mark for the range of butadiene copolymers manufactured by I.C.I.

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

PB4

Rubber Compounds

MIXING TO CUSTOMERS OWN SPECIFICATIONS
CARBON BLACK MASTERBATCHES A SPECIALITY

TECHNICAL ADVISORY SERVICE AVAILABLE
YOUR COMPOUNDING REQUIREMENTS

Serving the Rubber Industry since 1872

BRR

BRITISH RECOVERED RUBBER AND CHEMICAL COMPANY LIMITED

Ashton New Road · Clayton · Manchester 11
Telephone: East 1406/7/8
Telegrams: Reclaimed, Manchester

Scottish Agent: R. M. Wilson, 237 St. Andrews Road, Glasgow, S.1

Rhein-Chemie works for progress

We supply for the rubber industry :

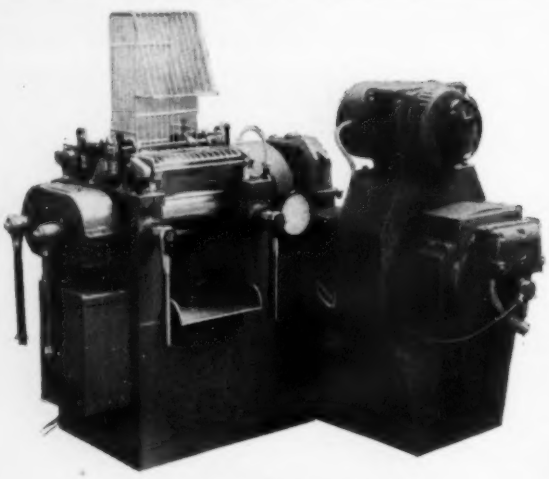
Aktiplast	Peptizer and Dispersing agent
Antilux	Light-crazing protector
Antilux AO	Light-crazing protector with non-staining antioxidant
Factice	white, also for hot vulcanization — yellow, for light coloured compounds — brown, for general use
Antidust 1060	Liquid separating agent for uncured stock and extrusions
Additive Pastes 1100 and 1600	Additives for blown compounds — improve the cell structure — remove odour — disperse and activate white fillers
Dispersions	for coating, combining and doubling of fabrics — for the production of adhesives and — for backing tufted carpets
Reclaim	Natural and Synthetic Rubber Reclaims in various grades

RHEIN-CHEMIE GmbH, Export Department, Heidelberg

Represented in the U.K. by : **Messrs. Lonabarc Ltd., 110 Cranbrook Road, Ilford, Essex**

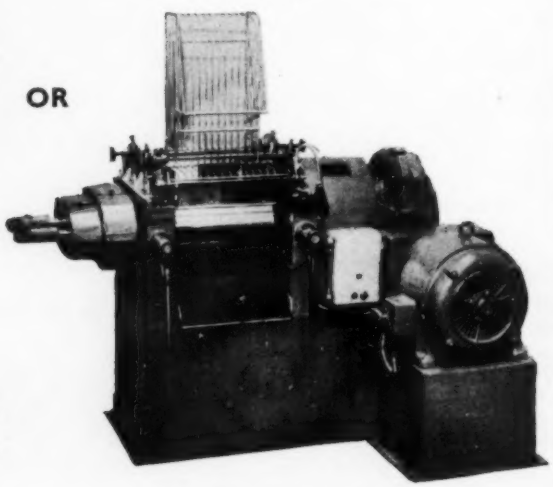
RUBBER & PLASTICS LABORATORY MILLS

In regular production for prompt or early delivery



VARIABLE SPEED

OR



SINGLE SPEED

Full Specification on request

JAMES H. PULLEN (1942) LTD.

ROTHERMERE ROAD, WADDON, SURREY.

CROydon 6067/8

behind every
Francis Shaw machine

research–design–quality engineering

A429

Constant research and development, close co-operation with users, advanced design, selected high quality materials . . . These, coupled with long experience, help to create processing machinery of unrivalled performance.

Francis Shaw rubber extrusion machines are made in scroll sizes from one inch upwards. The 3-inch model illustrated is one of the new Shaw cold feed extruders

- **Consistent quality of extrusion**
- **Saves space, labour and capital by eliminating pre-warming of stock**
- **Range of sizes 1″ to 6″**
- **Special design of screw, barrel and drive**

Francis Shaw

FRANCIS SHAW & COMPANY LIMITED · MANCHESTER 11 · ENGLAND

TELEGRAMS: "CALENDER" MANCHESTER · TELEPHONE: EAST 1313-8 · TELEX: 66-357

London Office: 22 Great Smith Street London SW1 · Telephone: Abbey 3245 · Telegrams: Vibrate London · Telex: 22250

Canada: Francis Shaw (Canada) Ltd Grahams Lane Burlington Ontario · Telephone: Nelson 4-2350

Telegrams: Calender Burlington Ontario · Telex: Canada Calender Hamilton 021/662

OVERSEAS AGENTS THROUGHOUT THE WORLD

P4391-2

Rhein-Chemie works for progress

We supply for the rubber industry :

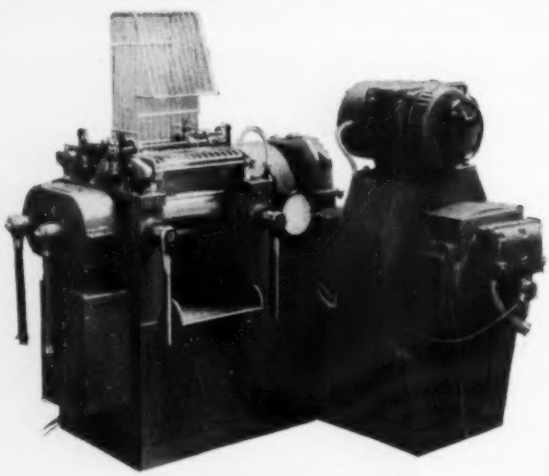
Aktiplast	Peptizer and Dispersing agent
Antilux	Light-crazing protector
Antilux AO	Light-crazing protector with non-staining antioxidant
Factice	white, also for hot vulcanization — yellow, for light coloured compounds — brown, for general use
Antidust 1060	Liquid separating agent for uncured stock and extrusions
Additive Pastes 1100 and 1600	Additives for blown compounds — improve the cell structure — remove odour — disperse and activate white fillers
Dispersions	for coating, combining and doubling of fabrics — for the production of adhesives and — for backing tufted carpets
Reclaim	Natural and Synthetic Rubber Reclaims in various grades

RHEIN-CHEMIE GmbH, Export Department, Heidelberg

Represented in the U.K. by : **Messrs. Lonabarc Ltd., 110 Cranbrook Road, Ilford, Essex**

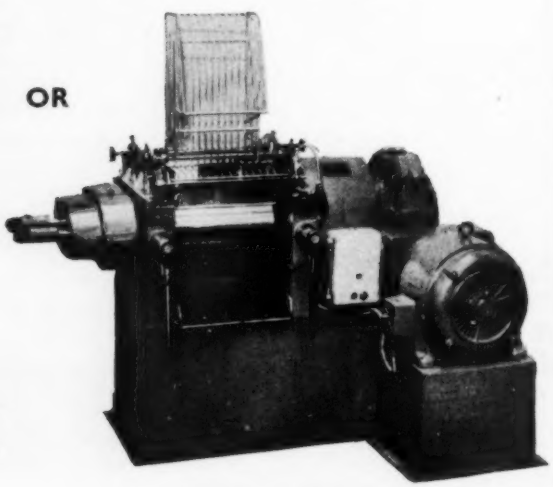
RUBBER & PLASTICS LABORATORY MILLS

In regular production for prompt or early delivery



VARIABLE SPEED

OR



SINGLE SPEED

Full Specification on request

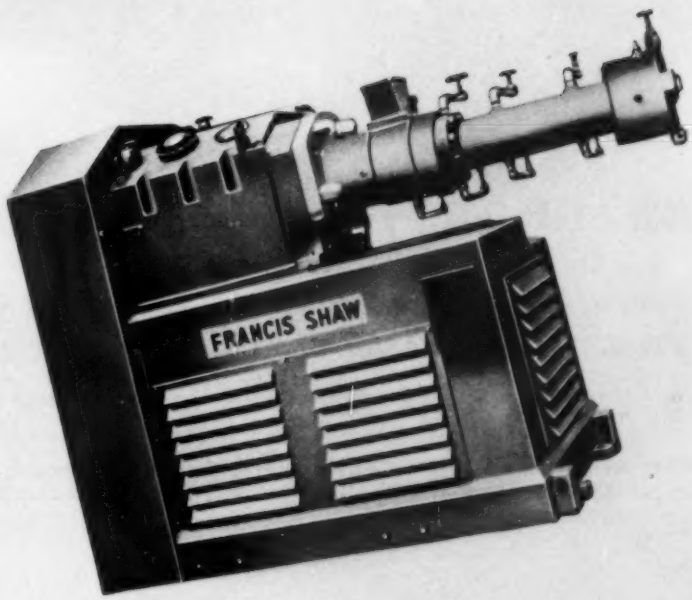
JAMES H. PULLEN (1942) LTD.

ROTHERMERE ROAD, WADDON, SURREY.

CROydon 6067/8

behind every
Francis Shaw machine

research–design–quality engineering



A429

Constant research and development, close co-operation with users, advanced design, selected high quality materials . . . These, coupled with long experience, help to create processing machinery of unrivalled performance.

Francis Shaw rubber extrusion machines are made in scroll sizes from one inch upwards. The 3-inch model illustrated is one of the new Shaw cold feed extruders

- **Consistent quality of extrusion**
- **Saves space, labour and capital by eliminating pre-warming of stock**
- **Range of sizes 1" to 6"**
- **Special design of screw, barrel and drive**

S ***Francis Shaw***

FRANCIS SHAW & COMPANY LIMITED · MANCHESTER 11 · ENGLAND

TELEGRAMS: "CALENDER" MANCHESTER · TELEPHONE: EAST 1313-8 · TELEX: 66-357

London Office: 22 Great Smith Street London SW1 · Telephone: Abbey 3245 · Telegrams: Vibrate London · Telex: 22250

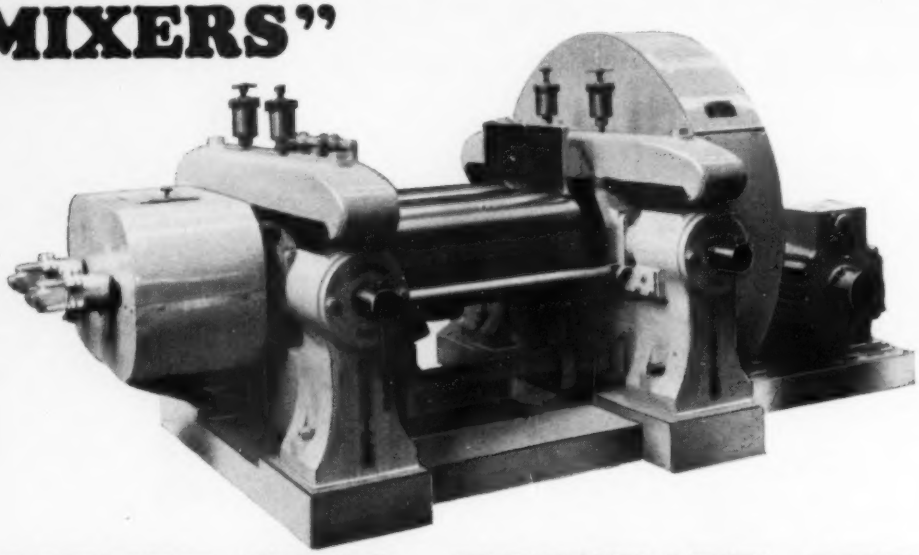
Canada: Francis Shaw (Canada) Ltd Grahams Lane Burlington Ontario · Telephone: Nelson 4-2350

Telegrams: Calender Burlington Ontario · Telex: Canada Calender Hamilton 021/662

OVERSEAS AGENTS THROUGHOUT THE WORLD

P4391-2

"MIXERS"



CARTER BROS. (ROCHDALE) LTD.

RUBBER AND PLASTICS ENGINEERS

Mixers, Calenders, Extruders, Presses. Repairs a Speciality

MELLOR STREET, ROCHDALE, LANCS. • PHONE 4431

ZINC OXIDES

"Zincoli" Standard Grades and "Zincoid" Extra Fine Particle Size

AMALGAMATED OXIDES (1939) LIMITED

DARTFORD • KENT

SOLE DISTRIBUTORS: MORRIS ASHBY LTD., 10 PHILPOT LANE, LONDON, E.C.3

TELEPHONE: MANSION HOUSE 8071

*Specialities**

factice

FOR HOME AND EXPORT

EXTENDS · PLASTICISES · SOFTENS · AIDS
PROCESSING · GIVES "FEEL" · RESTRAINS BLOOM

All grades made under strict technical control
and uniformity guaranteed
Our Technical Department is at your service

*ALFRED SMITH, LTD

STONEFERRY, HULL

Telephone: Hull 41311 (9 lines) Cables: "Bisulphide" Hull

WORKS: Oak Road, Newland, Hull (Telephone: Hull 18880)

LONDON: 88 Leadenhall Street, E.C. (Telephone: Avenue 4081/3)

PLANTATION RUBBER
RUBBER LATEX

All Grades

For samples and prices please write to :

HILTON, WALLACE & CO. LTD.
St. Dunstan's House
Idol Lane, London, E.C.3
Telephone : Mansion House 1005

Master Batches

Rubber—Black
Plastics-Fillers

Mixed & Diced

PROMPT DELIVERY

Enquire

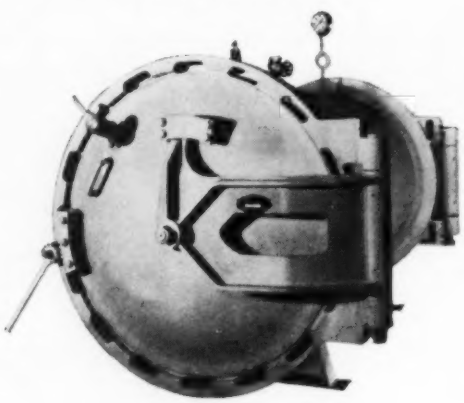
HATCHAM RUBBER CO. LTD.
PRINCES WAY, WADDON
CROYDON, SURREY
Telephone : CROydon 6054/6

Specialists in

VULCANISING PANS

AUTOCLAVES AND PRESSURE VESSELS

BOLTLESS DOORS MANUALLY OR POWER OPERATED

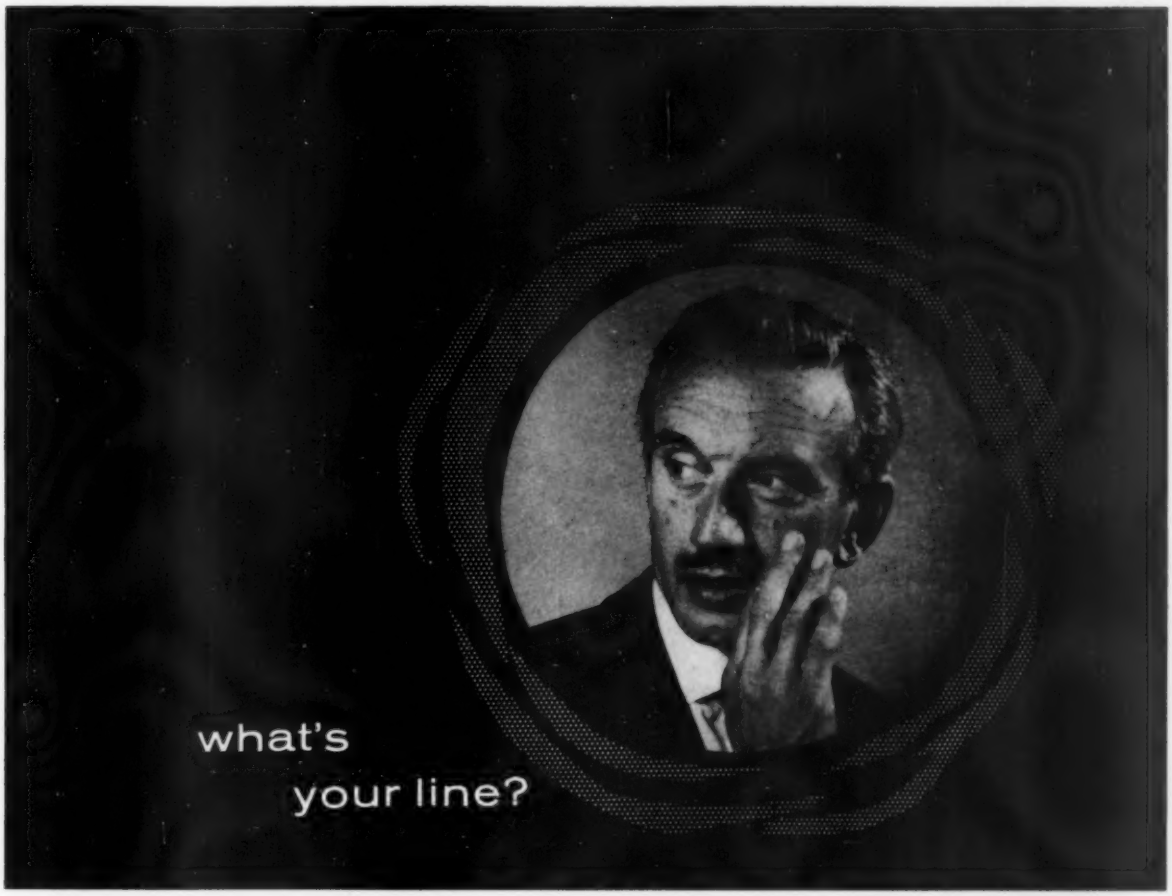


MANUFACTURED BY

R. LORD & SONS LTD.
Barnbrook Boiler Works, Bury, Lancashire
Telephone: Bury 226 and 4721

GEO. HANKIN & CO.
VICTORIA HOUSE, 118 FENCHURCH STREET, LONDON, E.C.3
Telephone: Mincing Lane 2737/9 *Telegrams: Outerly, Telex*

CRUDE RUBBER
LIQUID LATEX
SOLE CREPE



you might solve your problem with *micafine*

Already well established, Micafine Mica powders are becoming increasingly valuable to the Rubber Industry. Their scope in the many varied spheres of production is constantly increasing, and there is every possibility that Micafine Mica powders could help in the solution of some of your production problems.

As a lubricant Mica powder is ideal. With its chemical inertness and unique physical form it is equally effective applied either dry or wet in the form of a slurry.

In sponge rubber Mica powder has unique qualities as a filler. Chemically inert, it actually increases the load bearing properties, without impairing the efficiency of the blowing process.

In latex foam Mica powder shows considerable advantages over other fillers, resulting in low density foams with good resilience and compression qualities.

In latex compounds Mica powder produces a marked hardening in the dried film, making it particularly suitable for hard casting compounds, adhesive and latex flooring compounds.

The production of Micafine for the Rubber Industry is given particular care and strict control at all stages of production ensures a high standard of quality.

To enable you to test the efficiency of Micafine Mica powders in your own laboratories, test samples will be sent free and without obligation on request.

micafine limited

MICAFINE LIMITED · RAYNESWAY · DERBY . Tel: DERBY 55981 (2 lines)

P29

Stretch—one of those characteristics of rubber that you may want—or want to get rid of. In surgical gloves it's essential; in ebonite mouldings, undesirable. One thing that should never s-t-r-e-t-c-h out on you is a delivery date.

I.S.R's good name for keeping firmly to delivery schedules is one good reason why so many leading rubber users have turned to INTOL SB Rubbers. You can plan production because you know where you are with I.S.R., and you can save money because of the low, stable price. **Six grades of INTOL are in production, filling the range of major requirements for SB Rubber. Please write for full details.**

INTOL Synthetic Rubber

stable price — consistent quality — assured delivery — technical service

The International Synthetic Rubber Co. Ltd.
HYTHE · SOUTHAMPTON · Telephone: Blackfield 3141
Telex: 47627 Cables: INTOL HYTHE

STRETCH

Editorial Director: J. D. COPEMAN. Consultant Editor: H. J. STERN, B.Sc., Ph.D., F.R.I.C., F.I.R.I. Advertising Director: C. B. COPEMAN. Advertising Manager: A. S. KINGHAM.

Editor: RICHARD ROWLAND

UK Area Representatives

M. J. Whelan, London, Eastern Counties, Huntingdonshire, Hertfordshire, Bedfordshire, Buckinghamshire, Northamptonshire, Kent, Surrey and Sussex (Operating from London Office)

L. Quy, South and West of England and South Wales (Operating from London Office)

A. J. Legg, 55 Lee Lane West, Horsforth, Nr. Leeds. Tel. No. Horsforth 3845, North-East England, Lancashire, Yorkshire, Nottinghamshire, Lincolnshire and Derbyshire

W. Brown, 13 Allerton Road, Southport, Lancashire. Tel. No. Southport 5121, Scotland

E. A. Daniel, 'Brockenhurst,' 18 Thornhill Park, Streetly, Sutton Coldfield, Warwickshire. Tel. No. Streetly 1485, Midlands (excluding Staffordshire North of the A.5), Cheshire and North Wales

E. Burgess. 40 Parkside Drive, Maybank, Newcastle-under-Lyme. Tel. No. 64678, Staffordshire North of the A.5

Foreign Representatives

United States—Overseas Publishers' Representatives, 29 West 34th Street, New York 1, N.Y. Tel. No. Bryant 9-0794

France—R. K. Larke, 7 Rue Pilaudo, Asnieres (Seine). Tel. No. Gresillons 42.24

Netherlands—G. Arnold Teesing, Rubensstraat 68, Amsterdam, Z. Tel. No. 727913

Germany—Albert Milhado & Co., G.m.b.H., Charlottenstrasse 32, Dusseldorf

Belgium—Albert Milhado & Co., G.m.b.H., Pompstraat 2, Antwerp

Italy—Massimo Fano, Via V. Monti 14, Milan. Tel. No. Milan 808135

Rubber Journal and International Plastics

Volume 138 **Price 1s. Post free 1s. 4d.** **No. 14**

IN ITS 76th YEAR

April 2 1960

Editorial

NOTES OF THE WEEK 495

Articles and News

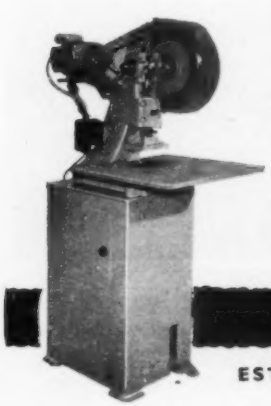
NEWS BRIEFS 496
NEW PHENOL PLANT ON STREAM 497
NEW £2M. PVC PLANT 498
POLYURETHANE FOAMS 500
NEW POWER RAMMER 506
PLASTICS IN INDIA 508
BRAINS TRUST 516

Features

VIEWS AND REVIEWS 509
MEN AND MATTERS 510
QUESTION CORNER 512
COMPANIES IN THE NEWS 514
ANCHOR CHEMICAL CO. LTD. MEETING 515
RUBBER STATISTICS 518
BOOK REVIEWS 518
PATENT SPECIFICATIONS 520
SYNTHETIC RUBBER PRICES 521
RUBBER MARKETS 522
INDUSTRY INTELLIGENCE 523

Classified Advertisements . . . 525 Advertisers Index . . . 528

MACLAREN HOUSE, 131 GREAT SUFFOLK STREET, LONDON, S.E.1
Grams: 'Buns, Souphone, London' Phone: HOP 5712
Annual Subscription, including Postage: United Kingdom and Oversea, £2 15s.; Index (half-yearly), 10s. per annum extra. Published weekly. Registered at GPO as a Newspaper. Registered for Transmission by Canadian Magazine Post. Entered as Second Class matter at Post Office, Boston, Mass. USA, under the Act of March 3, 1879 (Sec. 397 P. L. and R.)

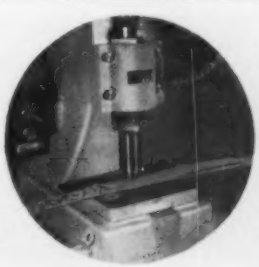


squire power-cutting press

For trimming mouldings and cutting washers from sheet or strip.

Gaskets and Seals up to 7" x 5". For use with Cropping Tools etc. Very little floor space is required, making the Machine a valuable addition to any plant.

The Machine has been planned to take many different tooling arrangements for the Rubber Trade.



★ WE DESIGN AND MAKE CUTTERS TO SUIT ANY MACHINE

FREDERICK SQUIRE LTD

ESTABLISHED 1850 33 MONSELL ROAD, FINSBURY PARK, LONDON N.4. TEL: CANonbury 4201

MORE EFFICIENT BRAKING
MORE TYRE WEAR
MORE NEED FOR BRITISH
PHILBLACKS*

Greatly improved braking and acceleration in modern motoring demands even higher tyre performance.

Furnace Carbon Blacks produced by Philblack Limited have a vital part to play—as a rubber reinforcing agent.

With modern plant and the highest production capacity in Europe, Philblack Limited is always ready to meet the rubber industry's growing demand for this essential raw material.

PHILBLACK LIMITED

WESTBURY-ON-TRYM · BRISTOL

There are five grades of **BRITISH PHILBLACKS*** **A** (F.E.F.) **O** (H.A.F.) **I** (I.S.A.F.) **E** (S.A.F.) **G** (G.P.F.) Our Technical Advisory Service at the R. W. Greeff Laboratory, Newbury, Berks., will advise on their use in any rubber compounding problem.

* *This is a trademark: Philblack Limited is a registered user*

Sole Sales Representatives:
R. W. Greeff & Co Ltd
31/45 Gresham Street, London, EC2
Telephone: Monarch 1066
Cables: Greeff, London, Telex: 22696

TGA P9

NOTES of the WEEK

Going Up

THE excellent results for last year reported by Imperial Chemical Industries Ltd. come as added emphasis to the surge of expansion activities in the rubber and plastics field. As reported last week, the Shell Chemical Company is to build a plant at Carrington for the manufacture of polybutadiene and polyisoprene synthetic rubbers. In the same week, British Hydrocarbon Chemicals Ltd. announced that three major new plants are to be built at Grangemouth. There, £5m. is to be spent on plants for ethylene dichloride, methanol and butadiene. Completion is scheduled for 1961. This week sees the news that British Hydrocarbon Chemicals' £4m. synthetic phenol plant, also at Grangemouth, has come on stream. It is the first of its type in the country and has a capacity of 13,000 tons a year. Also reported in this issue are details of yet another extension, this time costing £2m., to British Geon's polyvinyl chloride plant at Barry. Again, completion is scheduled for 1961. At the same time, the Witco Chemical Company Ltd. announced that it is to build a plant for the manufacture of synthetic rubber latices. This will have a capacity of over 3,500 tons a year.

This activity, and the above lists only the most recent announcements, reflects the ever-growing demands of more and more industries for plastics and rubber and other synthetics. It is a remarkable reflection on the progress and potential of our industries that even these expanded capacities cannot be said to be anything other than needed.

Management Education

RADICAL changes are to be made in the present schemes of management studies and commerce. Details announced on March 28 by Sir David Eccles, Minister of Education, in a circular to local education authorities, show that there is to be: a new Diploma in Management Studies; an Advisory Council on Management Education and two new 'National Certificates in Business Studies.'

Because of the educational and economic needs of the country, the Minister is convinced that there must be a major advance in management education. This can only be achieved, says the circular, by developing post-graduate courses and research in management comparable with the striking advances in technological subjects made by the Colleges of Advanced Technology and major technical colleges. In this way management education will be given its rightful place as an advanced study appropriate for graduates and professionally qualified men and women who also have a background of practical experience in industry or commerce. Education for management in this country has great variety and is provided in many different kinds of institution. So far, however, there is no adequate provision of extended courses of a more advanced kind.

A new Advisory Council on education for management is to be appointed by the Minister of Education, Secretary of State for Scotland and the Minister of Education for Northern Ireland. The Council will be broadly based and will, it is hoped, consist of representatives from management and the teaching institutions, from industry and professional bodies. The setting up of the new council is considered to be a significant step forward in the history of management education in this country. It will bring together a good variety of knowledge and experience and should help the technical colleges to make a wider and deeper contribution in this field.

Svengali Research Association

IS it possible that up until very recently, and quite unknown to the public in general, bands of market researchers have been roaming the countryside, hypnotizing housewives? The question is prompted by the appearance in the papers this week of a remarkable announcement. It read in part as follows: The Market Research Society has decided to proscribe the use of hypnotism as a market research technique and has revized its code of standards accordingly.

It would appear that such a technique has been used, since it is now proscribed, and one wonders whether these hordes of Svengalis toured the country in vans or estate cars equipped with suitable couches or whether they had so mastered the technique that they could achieve their purpose in an instant on doorstep or pavement.

The statement continued: The Society states that evidence suggests that the respondent in a hypnotic interview surrenders conscious and critical control over what he or she says. This conflicts with the right of respondents in interviews, as volunteers, to withdraw at any time by refusing to answer a specific question or by terminating the interview. In addition, it is stated, some authorities believe there may be harmful after-effects.

Although proscribed as far as market research is concerned there are clearly immense possibilities in other and allied directions. Will it, for instance, become established practice to ask prospective representatives 'How's your hypnotism?' Will training courses be created for, say, rubber goods salesmen and wandering purveyors of plastics houseware? The questions, and developments, are endless.

NEWS *Briefs*

MONTECATINI LOOK AHEAD — A POLYSTYRENE PRODUCT—CALIFORNIA BLACK PLANT—MEXICAN POLYTHENE — USSR OFFER FOR ASIAN RUBBER

●**United States**—Goodyear has laid off from 15 to 20% of its personnel in the foam products division, and the number of working days has been reduced. The company said the lay-offs were caused by production cutbacks of automobile and furniture manufacturers.

●**United States** — Synthetic rubber exported in February was 31,300 long tons—twice that exported in February 1959. Producers said that improved industrial production in Europe was a big reason for the increase.

●**Mexico**—Simon-Carves Ltd. have received an order for the design and supply of equipment for a polythene plant for Petroleos Mexicanos, the national oil company of Mexico. It will operate the I.C.I. process under agreement.

●**Canada** — Production of 'Insulair,' an expanded polystyrene insulation material, has commenced at the General Products Division of Dominion Rubber Company, Montreal. This is an entirely new product for the division, and is destined for construction and industrial applications.

●**Thailand**—A. M. Mitine, commercial counsellor at the USSR Embassy in Bangkok, said that the USSR was ready to offer to conclude long term trade agreements with Asia and would sign contracts to import products which included rubber. She could offer oil and oil products in return.

●**Canada** — Mailman Corporation Ltd., Montreal, is purchasing Koroflex Plastics, Ltd., of Brampton, Ontario, manufacturers of rain and winter plastic footwear from B. F. Goodrich Canada Ltd. Announcement of the transaction was made jointly by R. V. Yohe, president of Goodrich, and A. S. McLean, president of British Rubber Co. Ltd., a Mailman Corporation owned company.

●**United States**—Continental Carbon plans to build a $2,500,000 carbon black plant at Bakersfield, California. The new facility, it is reported, will have an annual capacity of 30 million lb. of carbon black. Construction is expected to start soon, and the plant is scheduled to be completed by mid-1961. Continental Carbon is owned by Continental Oil Co., the Shamrock Oil and Gas Corporation and the Witco Chemical Company.

●**Italy** — Montecatini expects to double its production during the next four years with a total investment of 200,000 million lire. This was stated by chairman of the company, Count Carlo Faina, who said the increase would be mainly in plastics, synthetic yarns and synthetic rubber.

●**Mexico**—The Department of Agriculture has announced plans to plant 600 hectares with rubber trees. The programme will be carried out in El Palmar, in the State of Veracruz. If successful, the plantation will be increased to 3,000 hectares. At present, 200 million pesos are being spent annually on raw rubber imports.

●**West Germany** — West German rubber products manufacturers who are members of the Association of the German Rubber Industry had a turnover of DM2,750m. last year. This is 14% up on 1958.

●**Israel** — A subsidiary of the Fertilizers and Chemical Co. of Haifa, Industrial Chemical Equipment Ltd., has been established to design and organize the manufacture of equipment for the plastics and other industries. Production of I£15m. worth of equipment a year is anticipated.

●**Germany** — The West German rubber tyre industry produced 228,000 tons of tyres last year, an increase of 21.1% over 1958, the West German tyre maker Continental Gummi-Works AG said on March 29. Truck tyre output rose by 38.8%, agricultural vehicles by 20.5%, motor car tyres by 19.1% and bicycle and motor cycle tyres 7.9%.

●**France**—Tyre output in February totalled 22,150 tons against 21,700 tons in February 1959. Exports totalled 5,790 tons against 4,409 and imports 521 against 376.

●**Germany** — The Hamburg - Indonesian Import Company, Indoham, has been founded here for the sale of products from Indonesian State-owned plantations, including latex, according to the West German economic news agency VWD. Indoham, owned jointly by West German and Indonesian firms, will sell the imported goods in Hamburg for the State-owned Indonesian company, PPN Baru.

'Excuse me, this is Mr R. W. Lunn's residence is it not?'—478

New Phenol Plant on Stream

£4m. GRANGEMOUTH PLANT FIRST OF ITS TYPE

THE new synthetic phenol plant at Grangemouth of British Hydrocarbon Chemicals Ltd. is now on stream and has already, the company says, been worked up satisfactorily to its design rating. The quality of the phenol and of the acetone which is the other major end-product, is said to be 'in every way up to expectations, and the plant is now a 'valuable and timely contributor to world supplies of this basic chemical.'

Night shot of the Grangemouth cumene phenol unit. Cooling towers and part of the north factory in left background

The £4m. plant, with a production capacity of 13,000 tons of phenol a year, is the first of its type to be built in this country, and consists of two units. In the first, cumene is produced by reacting benzene with propylene, a product of the primary 'cracking' process used at Grangemouth. In the second, the cumene is oxidized to its hydroperoxide, which is then split into phenol and acetone; this unit uses the modern continuous process invented and developed by Distillers. To avoid the discoloration associated with trace contamination with iron, a large part of the plant has been fabricated in stainless steel.

The new installation includes a process control laboratory and modern equipment for bulk handling of the products, for despatch by both road and rail tank wagons; the acetone can also be shipped by sea tanker. For the phenol, which has the unusually high melting point corresponding with its purity, special insulated stainless steel tanks are used, fitted with heating coils.

British Hydrocarbon say that the design of the plant is such that, with the phenol unit in full operation, surplus capacity for cumene production is available and a major export order is already being met by regular shipments in bulk from Grangemouth to Europe. Distillers, who will be the sales agent for the new BHC products, comment that the plant is the latest result of the combination of their knowledge of chemicals and the refinery experience of British Petroleum.

The cumene to phenol process was developed some twelve years ago by the DCL research establishment at Epsom. At that time, manufacturing capacity in the UK was sufficient to meet the chemical industry's demand for phenol, but the process was subsequently licensed for manufacture in a number of foreign countries. Plants have now been completed, or are under construction, in Belgium, Canada, France, Germany, Italy, Japan and the USA, and it is estimated that by the end of next year some 200,000 tons of phenol will be manufactured annually by this method.

Various plastics companies in the Distillers Group, it is understood, will use 'large quantities' of the phenol manufactured at Grangemouth.

Russia Buys British

The Soviet Union has bought 3,000 tons of natural rubber for immediate shipment from the British stockpile, it was reported on March 23. The deal is worth just over £1m.

The Board of Trade said it was unable to disclose details of individual purchases from the stockpile but pointed out that a bid from any foreign buyer—including the Soviet Union—would be accepted if satisfactory. At the end of last month, the UK stockpile stood at 72,000 tons, most of it originally graded as No. 1 RSS.

Rubberized Asphalt for New Ring Road

Natural rubber is incorporated in both base and wearing courses of the first section of Birmingham's new Inner Ring Road, opened on Friday March 11 by the Minister of Transport. Known as Smallbrook Ringway, the section consists of dual three-lane carriageways, with an additional 8ft. loading lane on the nearside of each carriageway, running from Suffolk Street to the Bull Ring Market. For part of its length it is carried on viaduct with a car park under.

Laid on a concrete foundation, the surfacing of the running lanes consists of a base course, 2½in. thick, of normal rubberized asphalt to BS 594 topped with a 1½in. thick wearing course of red coloured rubberized asphalt dressed with ½in. red precoated chippings. The Pulvatex rubber powder used was added to the aggregate during mixing in the same manner as a filler.

Birmingham first used rubber in a test bus-stop laid in 1951. After watching its behaviour for six years the first rubberized road surface was laid on the newly reconstructed Liverpool Street in 1957; several other roads within the city have since been similarly surfaced.

Pernis Plant

Shell Nederland NV, as anticipated (*RJIP*, March 26) announce that the new synthetic rubber plant at Pernis, near Rotterdam, will eventually produce polydiene rubbers, as well as standard types. The plant is due to start operating in the near future.

At the extraordinary meeting of Sandac Rubber Estates last week in London, the sale of the company's Tabanac Estate for Malayan $775,000 was unanimously approved.

New £2m. PVC Plant

BRITISH GEON EXPAND AGAIN

WORK will begin shortly on the £2m. extension to British Geon's polyvinyl chloride plant at Barry, South Wales.

This will be the eighth extension of the Geon PVC plant during the thirteen years it has been in operation. Work is expected to be completed during the second half of 1961.

This announcement follows on the heels of the publication of British Hydrocarbon's recent expansion plan at Grangemouth. It was anticipated (*RJIP*, March 26) that some of the raw materials to be manufactured by the three new plants to be built there — which include ethylene dichloride—would be absorbed by the Distillers group. Up till now British Geon, which is 55% owned by Distillers (the remaining 45% being owned by B. F. Goodrich) have been manufacturing PVC from acetylene and hydrogen chloride. It seems now possible that some at least of the PVC made at Barry may be manufactured from ethylene dichloride, although Distillers had no comment to make on this speculation.

If this is the case, the hydrochloric acid which is a by product in the ethylene dichloride process, may be used in the second process, and both processes worked simultaneously.

At present the number of people employed at Barry is about 1,200.

New Microcell Company

Microcell Ltd. announces that its Rubberized Hair Division has been formed into a subsidiary company known as Rubberized Hair Ltd. The works are at 9-11 Curtain Road, London, E.C.2. The members of the board are Mr Henry Kremer, Mr W. A. Bartlett and Mr M. R. C. Saunders (Executive Director). The company has the full backing of the parent company, Microcell Ltd.

It was decided to form the company to enable the expansion programme planned for the Rubberized Hair Division to be carried out more effectively.

Francis Shaw and Co. is reported to have acquired substantially all the capital of Joseph Robinson and Co. of Salford, Manchester.

I.C.I. PLASTICS IN USSR

In June and July a unique exhibition is being held in the USSR. The Plastics Division of I.C.I. Ltd. will be featuring a display in the Polytechnical Museum, New Square, Moscow, from June 3-17, and at the Exposition Pavilion in the Park of Kirowa, Leningrad, from July 15-30. This is the first time a foreign plastics exhibition has been held in the USSR.

The exhibition in Moscow will be opened by the British Ambassador, and a reception on the evening of June 3 at one of Moscow's leading hotels will provide an opportunity for Soviet and British technologists to meet.

Russian visitors, I.C.I. comment, will be able to see many of the latest developments in this field and obtain much detailed technical information about I.C.I. plastics. Chemists and technologists will give talks which will be illustrated by films and slides. R. H. Windsor Ltd. will give demonstrations of injection moulding and extrusion, and in Leningrad one of their extruders will be used to illustrate new techniques.

Mario Armengol, a well-known Spanish designer, has designed the static displays in the exhibition.

Fibrenyle Plans

Fibrenyle is planning a new 18,000 sq. ft. factory at Park Royal, London. When completed it is said that this will increase the company's capacity by well over 50%.

The new works will make blow-moulded polythene containers and it is expected that construction will begin in about six months.

Titan Canada

British Titan Products of Canada, a subsidiary of British Titan Products Co. of UK, will establish a $15 million plant at Tracy, just outside the city limits of Sorel, Quebec.

Mr G. M. Beeby, chairman of the British parent company, said the plant would have an initial capacity of 23,000 tons of titanium oxide pigment annually.

Wilton Strike

Unless a settlement is found, the strike at I.C.I. Wilton may involve 9,000 men—and may affect others at Billingham. As *RJIP* goes to press, management overtures have so far been rejected by AEU members, who are protesting against the suspension of a chargehand.

Witco Plans Synthetic Plant

Witco Chemical Company Ltd. announced last week it will start construction of a plant to produce synthetic rubber latices located in the Midlands. It will have an initial capacity of 8,000,000lb. per annum and will produce a complete line of butadiene - styrene latices, high styrene latices, nitrile latices and other acrylic types of latices. The plant is scheduled for completion during 1961.

Witco maintains sales offices in London, Manchester, Glasgow and Rotterdam and markets its products in France through a wholly-owned subsidiary. The firm is presently compounding synthetic latices in the UK with plant and laboratory facilities at Droitwich.

The dead matt surface and flexibility of Mellowhide Products' white Melloroid (made from Geon PVC) made it a suitable choice for this home cinema projection screen. The screen can be easily rolled up without damage

INTERESTED IN THERMAL INSULATION?

for clothing or caravans?
for ships or steam pipes?

why not consider

POLYURETHANE FLEXIBLE FOAMS

made from I.C.I. Isocyanates,
Polyesters & Prepolymers

Ask for details of Daltocel SF, Daltocel PP1,℗
Suprasec SF

- New
- Easily applied
- Lightweight
- Robust in service
- Low inflammability
- Hard wearing
- Highly efficient

and in clothing applications, can be washed or dry-cleaned and are easily fabricated, quilted or sewn.

℗ Patented in the main industrial countries

Enquiries should be addressed to

I.C.I. Sales Development Dept. (Polyisocyanates),
Ship Canal House, King Street, Manchester, 2.

ICI

IMPERIAL CHEMICAL INDUSTRIES LIMITED
LONDON SW1 ENGLAND

X84

Polyurethane Foams*

PART 1: BASIC EQUIPMENT FOR FLEXIBLE FOAMS

By J. M. BUIST (I.C.I. Ltd.)

POLYURETHANE foams depend for their production on two main reactions, chain extension between isocyanate and hydroxyl groups to give an elastic polymer and reaction of the isocyanate with water to give a substituted urea with liberation of carbon dioxide. In the first reaction a true urethane is produced which will be a polymer when the material contains more than one hydroxyl group and when the isocyanate is also polyfunctional.

$$R.NCO + R^1.OH \rightarrow R.NH.COOR^1 \quad (1)$$

In the presence of water the initial reaction is probably the formation of a substituted carbamic acid, which is unstable and breaks down to give an amine and carbon dioxide gas, the amine then reacting with more isocyanate to give a substituted urea.

$$R.NCO + H_2O \rightarrow R.NH.COOH \rightarrow R.NH_2 + CO_2 \quad (2)$$

$$R.NH_2 + R.NCO \rightarrow R.NH.CO.NH.R \quad (3)$$

Theoretically any polyhydroxylic substance when reacted with a diisocyanate and water will yield a foam, but in practice it has been essential to match the reactants most carefully to obtain a satisfactory product and some degree of cross linking is desirable. Although polyurethanes can be produced by reaction of simple polyhydric alcohols such as glycols and glycerol, the amount of isocyanate needed is very high and therefore higher molecular weight polyhydroxylic bodies are normally used in order to reduce the isocyanate usage and give a greater control of the properties of the ultimate product.

The development of the polyurethane foam industry has been made with only a few diisocyanates and in the case of flexible foam tolylene diisocyanate (either 65:35 or 80:20, 2.4/2.6 isomer ratio) has been used almost exclusively[1]. The variation in the properties of the polyurethanes has been brought about by changes in the back bone structure of the polyhydroxylic half of the polymer. Polyesters which lend themselves very readily to variation in this way were used first and only later were polyethers used.

Polyesters are used by a single-stage process in which the polyester, diisocyanate, and water are brought together to a common point in the required proportions and mixed. This process demands the most careful matching of the reactivities of the liquid components and a correct balance between the rates of blowing and curing reactions. The initial viscosity of the resin coupled with its rate of increase is a vital factor in the maintenance of that balance. The rates of the reactions can be varied by the use of catalysts which are generally added to the water.

Polyethers of similar reactivity towards isocyanates could be obtained from tetrahydrofuran, but economic considerations placed foams from these materials at a marked disadvantage, despite their manifest superiority over the ester foams in resilience. Polymers based on propylene oxide condensates, which were much more attractive economically, could not originally be used in the single-stage process because of the preponderance of secondary hydroxyl ends, which are less reactive towards isocyanates, so that the polymer formation is out of step with the carbon dioxide production, and also because the viscosity of the polyether at the most desirable molecular weight is too low to give adequate control. Recently, however, the development of new catalysts[2] has made possible the manufacture of polyether flexible foam by the single-stage process.

In order to overcome the above difficulties a two-stage process is used, in which an intermediate step in the foam preparation involving the formation of a prepolymer between the polyether and isocyanate was developed. This is carried out by heating the polyether and isocyanate in the presence of branching components and the final foam formation is carried out by reacting the prepolymer with water. Catalysts are still necessary to give proper control of the reaction rates.

The common important features of these processes have been listed[1]; to operate both processes accurate metering control of the supply of materials to the mixing point is essential; the flow rates must be accurately controlled and maintained constant during mixing; the unfoamed mix must not be allowed to fall on top of material which has already begun to foam.

These features or principles appear simple enough, but the design of suitable equipment incorporating them has not been a simple task. The fast speed of reaction of the chemicals used made it possible to achieve high rates of production and the urge to minimize waste has encouraged manufacture of thicker and wider blocks of foam. This has involved designing machines of high throughputs—*e.g.*, of the order of 120lb. per minute—and has called for engineering skill of a high order. In fact, success in making good quality polyurethane foams (flexible and rigid) has depended as much upon engineering as upon chemical skill.

FLEXIBLE FOAM

Laboratory Process

The fact that flexible foams can be made in the laboratory by a simple technique of mixing with a high speed stirrer has sometimes obscured the importance of the engineering aspects. In most laboratories an initial mixing of the polyester and isocyanate is carried out in a containing vessel. This vessel is moved up and down at the same time as stirring is taking place, so that air is finely dispersed in the mixture. After about half a minute of this agitation the activator mixture (catalyst, emulsifier, bubble modifier, and water) is added and the mixing continued until foaming begins, after which the foaming mixture is poured into a container or mould.

In the continuous manufacture of polyurethane foam, the separate ingredients are pumped into a machine mixing head, where they are agitated vigorously without the introduction of air and dispensed into a mould before foaming begins. This system differs in two important respects from the laboratory technique described above—the absence of air in the mix, and foaming does not begin until the mixture is in the mould. Laboratory experiments have shown that both factors have a marked effect on the resultant foam. In particular, the introduction of air can prevent shrinkage and pouring after foaming commences gives irregular structure.

In using these laboratory techniques

Paper delivered at the International Rubber Conference, held recently in Washington.

it was not always possible to reproduce and correlate foam structures similar to those made on large scale production machines. Experimental work has shown that by designing a suitable stirrer which mixes efficiently without entrapping air, by mixing for a short time of about 6 seconds after adding the activator, and by depositing the mixture in the mould whilst still relatively clear in colour—*i.e.*, before foaming starts—much better correlation between the laboratory results and machine practice is obtained. Less efficient mixing or extension of the time of stirring beyond six seconds after adding the activator leads to inferior structure in both polyester and polyether foams.

Basic Equipment for Factory Production

A schematic drawing of the equipment required for the manufacture of flexible polyurethane foam is shown in Figure 1. The manufacture of polyurethane flexible foams on a commercial scale from either polyesters or polyethers demands specially designed mixing equipment. Machines of a number of different types have been built, but all operate on the same basic principles — *i.e.*, the materials are metered continuously and piped to a mixing head from which they are deposited into a mould. Any reasonable number of materials may be metered separately, although some or all of the 'activator' components—*i.e.*, the materials other than the polymer and isocyanate — are usually premixed in order to simplify the engineering work.

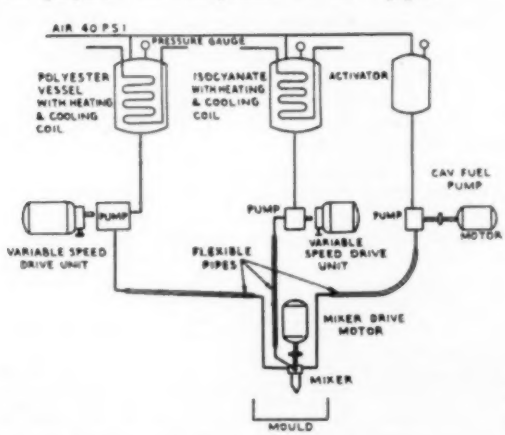


Fig. 1. Equipment for making flexible polyurethane foam

Metering Equipment

Various types of metering equipment are used, but mechanical pumps are the most common. For viscous liquids such as polyesters and polyether prepolymers gear pumps (Slack and Parr, Kegworth, Leicester) have been shown to be very efficient. It is necessary that they should be made with precision and, as they are usually run at low speeds—*e.g.*, of the order 50 to 100 rpm—fairly extensive reduction gearing is needed. On the other hand, their metering efficiency is of a high order and they show very little sensitivity to pressure changes in the pipelines. Other types of metering pumps which have been used (satisfactorily) for these viscous liquids include Moyno or Mono pumps, which consist of a helical rotor turning within a double-thread helical stator.

Metering of liquids of lower viscosity such as the isocyanate and activator may also be carried out by gear pumps, but other types are perhaps more commonly used. One well established reliable pump is the diesel fuel injection pump, which has the advantage of running at normal electric motor speeds and thus requires no reduction gearing. The flow rate is altered by changing the effective stroke of the pistons and a wide range of sizes is available. Pumps are available with one to eight cylinders and different sizes of cylinders. Each pump has at least 10 to 1 range of output. On one commercial range delivery rates between 2 and 5cc per minute and 9,000cc per minute can be obtained. Although designed to work against high back pressures such as occur in the diesel injection nozzles, this type of pump will work well at much lower pressures such as occur in ordinary open-ended feed pipes.

Another method of metering[3] which has advantages is the flowmeter—*e.g.*, rotameter. This is nonmechanical and cheap to install, and gives a visual indication of the flow rate. Although usually controlled manually, it is possible to arrange automatic control. The flowmeter readings are relatively unaffected by temperature changes in the case of liquids of low viscosity—*e.g.*, tolylene diisocyanate (viscosity of about 3 centipoises at room temperature)—but for more viscous liquids such as the activator mixtures (viscosity of the order of 40 to 50 centipoises) the flow rate may alter by as much as 5% per degree centigrade change in temperature at a constant float reading. Flowmeters should therefore be used only for liquids of low viscosity.

Conveyor

In the production of long blocks of polyurethane flexible foam, it is usual for the mixing head to traverse at right angles to the direction of the conveyor movement. If both conveyor and traverse move continuously, the liquid mix is laid down in a series of lines which are at small alternate angles to one another. If the conveyor is arranged to move in pulses timed to occur at each reversal of the traverse direction, the liquid is laid down in a series of parallel lines. In both cases the mix flows together to give an even layer on the mould surface. The intermittent conveyor motion shakes the foam to a considerable extent and this may be important and undesirable in thick blocks. The traverse mechanism may be operated by an air cylinder or by an electromagnetic clutch mechanism. In either case the width and speed of traverse may be altered.

The conveyor usually slopes down into the ventilation tunnel at a small angle—*e.g.*, 4° to 8°—to the horizontal in order to ensure that the liquid from the mixing head does not fall on material which is already foaming. The speed of the conveyor is related to the throughput of material and is an important factor in controlling the block height. It is not sufficient, however, to attempt to increase the height of foam merely by reducing the conveyor speed, as the angle of the surface of the rising foam to the mould surface may become too steep, with deep top cracks probably resulting. As a rough guide it can be said that to double the height of a foam block and maintain the same width, the conveyor speed should be increased by a factor of nearly two and the throughput by nearly four times.

Moulds

Although initially foam was manufactured in metal or wooden moulds, it is now customary to foam into paper which is fed from a roll through guides to form a continuous tray. The paper may be cut off continuously by knives at the end of the conveyor or, if suitably treated, pulled off and re-used.

Ventilation

It is absolutely essential that good ventilation should be provided in all

processes using tolylene diisocyanate. In continuous flexible foam production this is a simple matter, a ventilation tunnel completely covering the conveyor from the mixing head to a point at which the foam can be regarded as safe to be exposed to the open air. This should be equivalent in length to at least five and preferably 10 minutes, running time.

Recycling of Ingredients

It is often convenient to have return pipes from the mixing head to the storage vessels so that all the materials may be recycled. This enables metering pumps to settle down and temperature to reach equilibrium before the components are pumped through the mixing head. A recycling system is convenient for long block manufacture, but it is a prerequisite of intermittent mixing such as is required for filling separate moulds. In some machines (Gabriel Williams Co. Inc., New York) a separate three-way valve (Figure 2) directs each material into the desired channel; in others (Newton Tool and Mfg. Co., New Jersey, and Jennings Machine Corp., Philadelphia) a single valve controls the flow of all the materials. When the supplies are cut off, the mixing head contains a certain amount of potential foam and it is clearly desirable that this should be an absolute minimum. This may be achieved in various ways—*e.g.*, the stirrer should occupy a large proportion of the volume of the mixer, and be so designed that it tends to force the material out of the head by centrifugal action. If necessary, a blast of air can be used to sweep out material adhering to the sides of the mixing head. Such methods are satisfactory when the interval between successive runs is relatively short, but if left for long periods it becomes necessary to remove the outer barrel of the mixing head and to clean it and the stirrer in solvent.

Methods of Mixing

Many methods of mixing have been considered, including hydrodynamic and ultrasonic mixing, but some type of rotating stirrer is almost always used. With most polyurethane flexible foam formulations the time available for mixing is limited by the speed of the reaction and the necessity of depositing the liquid mix in the mould before the onset of foaming (maximum time about six seconds). On the other hand, a certain minimum mixing time (probably one second, but depends on mixing efficiency) is necessary to achieve good foam, so that relatively narrow limits are set on the possible mixing time.

The problems of mixing are complicated by the widely differing viscosities and quantities of the materials involved, but a high rate of shear is essential. This naturally affects the efficiency of mixing, but it also has a pronounced effect on the viscosity of the polyesters or prepolymers normally used in foam manufacture, and this in turn is reflected in the enhanced reactivity of these materials. The effect can be achieved at low stirring speeds using

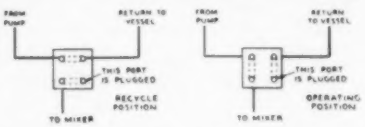


Fig. 2. Recycle valve system

mixers of complex design and large surface areas, or by high speed stirrers of relatively simple shape. Probably the chief disadvantage of the former is the much greater problem it presents of cleaning and dismantling. Even very small amounts of rubbery polymer remaining in the mixer may be sufficient to prevent it turning.

Broadly speaking, a mixer should be as versatile as possible—*i.e.*, it should be capable of mixing efficiently a wide range of different chemical formulations to give satisfactory foam in all cases. It should also be able to deal with high or low viscosity materials and, perhaps by alteration of stirrer speed, should mix efficiently over a wide range of throughputs. Easy removal of the head for cleaning is desirable, although a perfectly efficient self-cleaning head would be better. The technique of cleaning the mixing head by flushing out *in situ* with polyester or solvent is wasteful and often inconvenient.

Many types of mixers have been described ranging from plain cylindrical barrels containing simple peg stirrers to very complex designs having stirrers consisting of various sections, each of which is said to have a specific function. Even with the simplest type a variety of designs is possible. A cylindrical mixer of given volume, for example, may be in the form of a long, small diameter cylinder with a large number of pegs, or a short, large diameter cylinder having fewer pegs but with a much higher peripheral speed. The degree of shear is considerably greater in the second case. The mixer barrels may be fitted with stationary pegs to increase mixing efficiency or with shallow grooves in which the stirrer pegs fit to reduce the effective clearances. Horizontal pegs sweep out parallel discs in the mixer, but if the pegs are arranged at a small angle the whole volume of the mixer is swept. Another modification, sometimes referred to as a 'disc and doughnut' mixer (Fig. 3), consists of a cylindrical barrel into which stationary plates are fitted. These are in the form of horizontal rings so arranged that the materials must flow alternately through an annular space bounded on one side by the wall of the mixer and then through a hole in a disc surrounding the stirrer and reaching to the wall. The mixer barrel has to be split longitudinally in order to fit the stirrer into position and this raises problems of foam leakage at the joints.

Mixer barrels of other forms are used, a conical shape being probably the most common.

Various methods of introducing the materials into the mixing head have been described. Claims[4] have been made, for example, that high pressure injection of some of the components by means of diesel fuel injection pumps and nozzles has advantages. There is little evidence of better mixing by this technique, but the injection nozzles have the important practical advantage of acting as efficient nonreturn valves. On the other hand, some machines work satisfactorily at very low pressures using open-ended feed pipes. A mixer (patent application pending) has been designed in which the polyester and isocyanate are introduced first into an annular well surrounding the mixer barrel and then flow from this over a weir into the mixer itself, where they meet the activator. If there is no restriction at the outlet of the

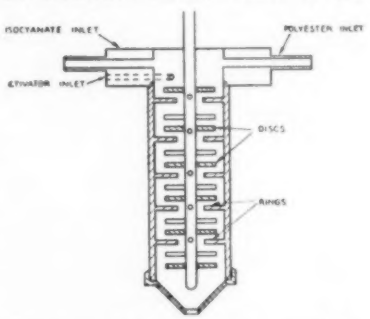
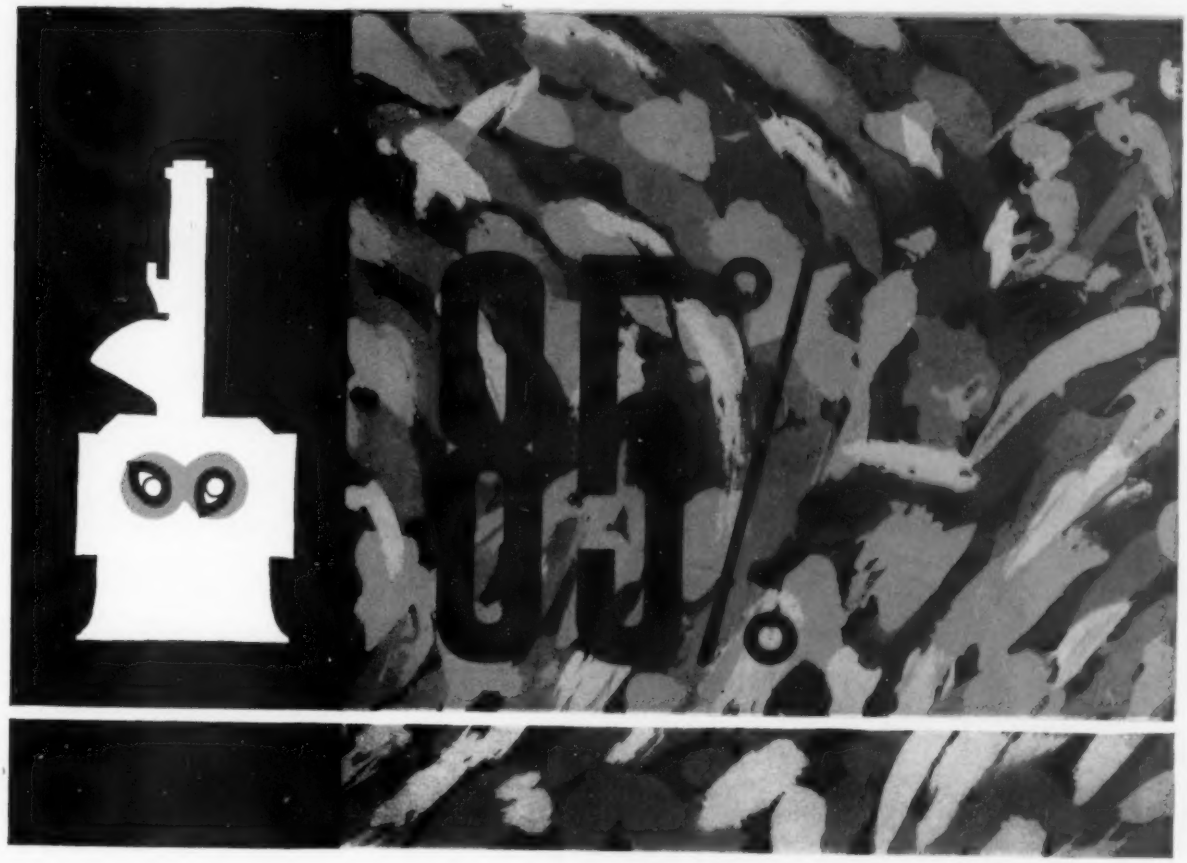


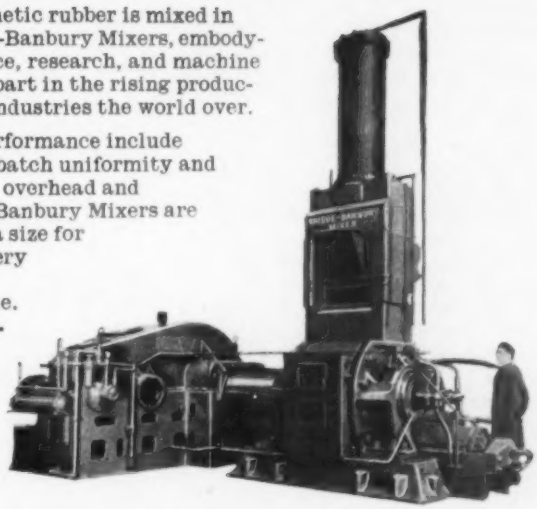
Fig. 3. Disc and doughnut mixer

mixer, the maximum pressure in the head cannot exceed that necessary to force the liquids over the weir and this is clearly very low. Good quality foams from both polyesters and polyethers have been made in this type of mixer. Mixing may be assisted by introducing some or all of the components at more than one point in the mixing head. One novel method[5] of achieving this is by making use of a hollow stirrer and feeding one of the components — *e.g.*, the activator— through the stirrer pegs. By this means an infinite dispersion of the



No less than 85% of the world's natural and synthetic rubber is mixed in Banbury Mixers.* Small wonder then, that Bridge-Banbury Mixers, embodying more than a generation of practical experience, research, and machine design, continue to play an almost indispensible part in the rising productivity of the ever-expanding rubber and plastics industries the world over.

Indisputable claims for Bridge-Banbury Mixer performance include optimum dispersion, speedier mixing, consistent batch uniformity and quality, increased production and a lower labour, overhead and maintenance cost per unit of production. Bridge-Banbury Mixers are designed for round-the-clock operation. There is a size for every production requirement. Ancillary machinery matched to deal with the increased output and further streamline the production flow is available.
Bridge-Banbury Automation is continuous production.



Fully detailed technical information is freely available on request.

* *Banbury is a registered trade mark in many countries throughout the world.*

* BRIDGE - BANBURY MIXERS *

. . . . ACCLAIMED AS THE ULTIMATE IN MIXER EFFICIENCY

DAVID BRIDGE & CO. LTD. CASTLETON, ROCHDALE, LANCASHIRE.
In technical association with Farrel-Birmingham Co. Inc. Ansonia, Conn. U.S.A.
'Phone Castleton, Rochdale, 57216 'Grams: Coupling. Phone Castleton Lancs.
London Office:
Broughton House, 6, 7, 8 Sackville St. Piccadilly, W.1. 'Phone Regent 7480. Grams & Cables: Ederaceo, Picc, London.

material occurs very rapidly. Premixing of two of the components—*e.g.*, polyester and isocyanate—before the introduction of the remaining materials has also been suggested[6]. Speed of stirring provides another source of variation. Some machines are provided with continuously variable speeds over a wide range, whereas others are designed to run at one fixed speed.

Temperature Limits

One of the problems arising from the high speed mixing of viscous materials is the rise of temperature which inevitably occurs from friction. This clearly depends upon the speed of stirring and the viscosity and flow rates of the liquids, but it may be several degrees centigrade and must be taken into account when changes in any of these factors are made. With the I.C.I. machine (patent application pending) the rise in temperature is 2° to 4°C. and it is probably desirable on most machines to limit the temperature rise to 6° to 7°C.

Outlet Nozzles

The design of the outlet nozzle of the mixing head affects the degree of hold up in the mixing chamber and has been shown by I.C.I. at Blackley to have an important influence on foam quality, and it is possible that further engineering research in this field will lead to better control of foam structure. The outlet nozzle has to be considerably smaller than the diameter of the mixing head itself, in order to prevent the liquid mix from being distributed over too large an area. Ideally the mix should leave the mixing head as a smooth column of liquid at a point not more than a few inches above the mould surface, in order to avoid splashing and the entrapping of air. The use of tubular extensions to the mixing head is an obvious method of achieving this, but care has to be exercised in the choice of tube, as it has been demonstrated that the cell size of polyester foam is affected to a considerable extent by the diameter of the outlet tube. This is probably a pressure effect, although no clear relationship has been established between the cell size of the foam and the pressure in the mixing head itself. An increase in the diameter of the outlet nozzle causes a decrease in the cell size of the foam. The foam may be very sensitive to these changes in diameter, an alteration of $\frac{1}{16}$in. sometimes having an appreciable influence on foam structure. This is not surprising if the effect is due to pressure changes, as the pressure drop in a viscous fluid at an orifice is proportional to the fourth power of the orifice diameter. By careful attention to the design of the outlet nozzle one can ensure that the foam structure is uniformly fine from the start to the end of a long run, whereas if there is a pressure build-up in the head foam structure can coarsen after a few feet of foam have been made. Not all foam formulations are as sensitive to these changes and in some cases it appears that there may be a critical pressure above which there is little influence on cell size. In general, the pressures in the mixing heads are small, although this is dependent on flow rates, etc.

Another factor having an important effect on foam structure is the presence of air. In large amounts complete collapse of the foam may occur but at lower levels very mixed cell size results. There is a general tendency to produce a fine cell size with very small quantities of air, but the problems of metering and controlling the amount and then dispersing it evenly are formidable.

Manufacture of Moulded Articles

The principles and factors discussed earlier in this paper which affect the efficiency of mixing — namely, the design of mixer, the period of hold up in the mixing chamber, the power input, along with the viscosity and miscibility of the chemicals being used—are all equally important in the design of equipment for making individually moulded articles. The development of suitable equipment has involved designing mixing heads (Newton Tool and Mfg. Co., and Jennings Machine Corp.)[7] which incorporate on/off devices which ensure rapid response to delivery and shut off of the ingredients. Work by I.C.I. on this subject is described in the next section dealing with rigid polyurethane foam.

REFERENCES

[1]Buist, J. M., and Lowe, A., *Plastics Inst. Trans.*, **27**, No. 67, 13 (1959).
[2]Houdry, *Modern Plastics*, **35**, No. 9, 146 (1958).
[3]Watts, J. T., *Plastics Inst. Trans.*, **26**, 289 (1958).
[4]Hoppe, P., Weinbrenner, E., Mulhausen, C., and Breer, K., Brit. Patent 769,682; US Patent 2,764,563.
[5]Arndt, Franz, Schulstrasse 220, Iserlohn.
[6]Packer, E. A., and Watts, J. T., *Proc. Inst. Rubber Ind.*, **4**, No. 5, 163.
[7]Knox, R. E., and Touhey, W. J., Contribution 122, Isocyanate Symposium, Upper Midwest Soc. of Plastics Eng., 1957.

(To be concluded)

Dexine Directors

The Dexine Rubber Company Ltd. has announced that Mr W. E. Foreman and Mr J. T. Hull have been appointed joint managing directors of the company from March 23 1960. Mr F. D. Wayre remains in office as chairman of the board.

THE NITRILE CASE

A new range of luggage has been launched by Martins of Birmingham, using North British Rubber's Royalite nitrile thermoplastic. Known as Martinflite, it is highly streamlined and said to be very light and hard wearing. Nitrile thermoplastic was

chosen for this application for its lightness, strength and resistance to abrasion.

Sheet Royalite of a grained surface in ivory, golden tan and Riviera red, are supplied by North British to Expendable Products of Leamington Spa who vacuum-formed it into a one-piece seamless shell which they pass to Martins. The range includes ladies' blouse case, wardrobe case, companion case and suit case.

New Silicone Products

I.C.I. research on silicones at the Ardeer factory of the company's Nobel Division has produced what the company calls Silicone Anti-Sticks. These are now available in development quantities and are said to impart non-migrating anti-stick finish to paper. DP.42 is a 100% silicone fluid and DP.111 is an emulsion of DP.42 in water.

The products are recommended by I.C.I. as finishes for paper that is used to back self-adhesive plastic films and labels, when migration into the adhesive would impair its efficiency. Other new products that have been produced by the division are a silicone antifoam and a flexible varnish.

Mr Charles H. Sommer has been elected president of Monsanto Chemicals Co., St. Louis, US, in place of Dr Charles A. Thomas, who has been elected chairman.

The previous chairman, Mr E. Monsanto Queeny, remains a member of the Board and chairman of the finance committee. Mr Sommer, who is 49, was elected executive vice-president and Board member of the Monsanto Chemical Co. in 1949. He joined the company in 1934.

"Don't scrap that scrap Mr. Stogberry!"

If you use P.V.C., you will have P.V.C. scrap. If you have P.V.C. scrap, you have, potentially more usable P.V.C. How?

Phoenix will take most grades of P.V.C. scrap from you. We will reprocess it, bulk blend it, strain it, calender or pellet it. We will make it every bit as good as new which if it was Phoenix P.V.C. in the first place is very good indeed.

Does all this call for a good deal of technical know-how? It does. Have Phoenix got it? They have!

That's money you're treating so lightly, Mr. Stogberry. Re-invest it with Phoenix, just reach for the telephone, ask for Phoenix and shout 'scrap'.

PHOENIX

P.V.C. SCRAP RECLAMATION SERVICE

Phoenix Rubber Co. Ltd., Slough, Buckinghamshire. **Telephone: Slough 22307/9**

New Power Rammer

USES LARGEST DMC MOULDING

THE ramming foot of the Pegson Power Rammer, which has a striking force of 8,000lb., is now being moulded in British Resin Product's Rockite dough moulding compound by Cascelloid. This was chosen, the firm says, because it possesses great strength combined with dimensional stability. Other factors that influenced the choice were its very good abrasion resistance, resistance to bacteriological attack, and the fact that it remains unaffected by extreme changes of temperature.

To comply with the weight specification Cascelloid, a Division of British Xylonite, have moulded cavities inside the foot. However, it is the largest DMC moulding in the country — weighing some 13¾lb. Maintenance is negligible as there is no question of rotting or corrosion and the foot will easily withstand the very heavy usage which the rammer gets.

The Pegson Rammer is a self-contained machine; by slightly tilting it it 'walks.' It is capable of striking up to 80 blows per minute and has a 21in. jump which can be controlled and maintained by the operator. It is 3ft. 9in. high, weighs 208lb. and because of the increased foot diameter the Rammer consolidates nearly 2 sq. yd. per minute with one pass. It is claimed that a 97% soil compaction can be obtained to depths of 12in. to 20in. quicker than with any comparable form of equipment.

Ramming foot of the Pegson Power Rammer, moulded in Rockite polyester dough moulding compound, easily withstands a striking force of 8,000lb.

Bristol Contract

Polyester glass hulls for a new outboard cabin cruiser are to be produced for Brensal Boats Ltd., Somerset, by the plastics department of Bristol Aircraft. The contract provides for an initial output of two hulls per week. It is anticipated that the glass fibre version will sell at about £415, exclusive of engine. This is some £60 higher than the wood hull version.

Fast Yellow

I.C.I. have produced a new pigment of golden yellow shade called 'Monolite Fast Yellow FRS.' Although it is mainly intended as an automobile lacquer, I.C.I. say that the new pigment shows 'excellent stability' in PVC with very high light fastness and complete freedom from migration and contact bleed.

A pure pigment dyestuff, it is said to have good dispersion properties and is considered to be valuable as a shading component for greener-shade yellows; on its own it provides a useful basis for bright cream shades and sunshine yellows.

The 'Condesco' drip regulator, a precision-made instrument for dispensing all types of liquid in droplet form, uses 'Perspex' and 'Alkathene.' The regulator is specially suitable for the introduction of detergents into bottle and churn washing plant, but can be used for all types of liquid, either acid or alkali.

ADVANCES IN SILICONES

At the Joint Meeting of the Midlands Sections of the Institution of the Rubber Industry and the Plastics Institute, on Friday March 18, P. A. J. Gate, of Midland Silicones Ltd., gave a paper which dealt with advances in silicones during the past three years.

Although few new types of resin had been introduced in the last three years, he said that improvements in electrical properties of silicone-glass laminates had been achieved by the use of glass cloth washed in hot trichlorethylene and then in hot detergent solution instead of heat cleaned glass cloth.

Silicone-epoxy resins had been developed for high temperature structure laminates which showed advantages in flexural strength over epoxide resins at temperatures of the order of 500°F and possessed considerably better electrical properties. Low viscosity silicone fluid could be used to improve the uniformity of cell structure in polyurethane foams, using either the prepolymer or the one-shot process. For the latter process silicone additives soluble in water and glycol had been developed.

The most interesting advance in the field of silicone rubbers Mr Gate said was the increased number of rubber manufacturers who were developing their own formulations. The introduction of polysiloxane polymers containing vinyl groups had achieved a marked improvement in reducing compression set of rubbers. These copolymers functioned satisfactorily with reduced amounts of curing agents, and thus permitted the curing of thicker sections and also the introduction of carbon black to produce conductive silicone rubbers.

Another major advance was the manufacture of compounds having lower shrinkage which permitted the use of silicone rubber in moulds designed for organic rubber. Silicone rubber tapes had been developed for electrical insulation and Mr Gate showed an example of self-adhesive tape. Silicone rubber covered rollers were being used principally in the plastics industry to give good release from hot thermoplastics in embossing and heat sealing processes.

Mr G. A. Rawcliffe, chairman of the Midlands Section of the Plastics Institute, was in the chair. Mr A. McAlpine opened a lively and informative discussion and Mr Bradshaw, chairman of the Midlands Section of the Institution of the Rubber Industry, proposed a vote of thanks to Mr Gate for making the joint meeting such an obvious success.

FURNACE

VULCAN 9 SAF
VULCAN 6 ISAF
VULCAN 3 HAF
VULCAN C CF
VULCAN SC SCF
VULCAN XXX SCF
VULCAN XC-72 ECF
STERLING SO FEF
STERLING S, PELLETEX } SRF
STERLING NS, PELLETEX NS } SRF-NS
STERLING L, STERLING LL } HMF
STERLING V GPF
STERLING 99 FF

CHANNEL

SPHERON 6 MPC
SPHERON 9 EPC
SPHERON C CC

CABOT

the world's only manufacturers of a complete range of Channel, Furnace & Thermal Carbon Blacks

THERMAL

STERLING FT free flowing FT
STERLING MT free flowing MT
STERLING MT-NS free flowing MT-NS

Plants throughout the South-Western United States, in Canada, England and France

Agents in principal cities of the world

London Sales Office

CABOT CARBON LIMITED 62 BROMPTON ROAD, LONDON, S.W.3

Tel. KNightsbridge 7181 (5 lines) Telegrams Cablak London Telex

Registered Office and Works STANLOW, ELLESMERE PORT, CHESHIRE

Plastics in India

A LONG WAY TO GO

THE Indian plastics industry, which has developed primarily during the last decade has undoubtedly a bright future, says S. L. Sapur in the *Bombay Technologist*, published by the technological association of Bombay University. But, he adds, there is a very long way to go; the *per capita* consumption of plastics is only 0.1lb. compared with 14lb. in the UK and 22lb. in the USA.

Raw Materials

In a review of raw materials and production, Mr Sapur says that amongst thermoplastics, which gained a lead over thermosetting compositions, a 2,500 ton plant for making polystyrene from imported monomer was set up at Bombay in 1957 at an approximate cost of Rs.1 crore (about £750,000). It is reported that a 10,000 ton plant for the manufacture of styrene monomer from alcohol and benzene will come into operation during the Third Plan period. This will enable expansion of the existing polystyrene unit. Besides, the monomer will also be available for the proposed 20,000 ton synthetic rubber plant to be located at Bareilly. The production of polystyrene foam plastics, started during the last few years, was 225 tons in 1958-59 and manufacturers have a planned programme to reach a target of 1,200 tons during 1959-60. The opening of the 3,500 ton plant for the manufacture of polythene from alcohol at Calcutta, in May 1959 is a landmark in the complete indigenous production of this plastic. Capital investment on both the units is of the order of Rs.8.5 crores (about £6½m.). Another 2,700 ton plant for polythene, also from alcohol, is expected to come into operation by 1961 at Bombay.

In 1952 the total consumption of polythene in the country was about 100 tons and in 1958 it rose to 2,100 tons—a twenty-fold increase and the demand is still increasing at a rapid pace. The UP Government is exploring the possibilities for installing a third polythene unit during the next Plan period. A 1,600 ton unit for the manufacture of polyvinyl chloride from acetylene and chlorine is expected to go into production by 1961 at Bombay.

Negotiations for the indigenous manufacture of nylon are in progress and recently a unit for making nylon monofilaments from imported polymer went into production at Bombay. The cellulose acetate yarn spinning factory at Hyderabad is expected to start production of moulding grade cellulose acetate, the demand for which by 1961 is estimated at 800 tons. The Government Cordite Factory at Aravankadu is already producing limited quantities of cellulose nitrate for use in lacquers and other applications. Plans for starting the manufacture of carboxy-methyl-cellulose and a few other cellulose derivatives in the private sector in collaboration with a Swedish firm, have been announced, and the indigenous production of cotton linters is expected to rise from the present figure of 900 tons to 4,000 tons by 1961.

The manufacture of certain plasticizers that are required for PVC, cellulose acetate, and other moulding compositions are included in the plans of a factory that is now under erection near bombay. The Sindri Fertilizers Factory has started the manufacture of urea for use as a fertilizer and it is expected that a product of the required purity to meet the needs of plastics industry will be shortly taken up. The indigenous manufacture of 1,200 tons of phenol, 1,500 tons of phthalic anhydride has been planned in the intermediate plants proposed to be set up during the Third Plan period. It is understood that two plants each of 6,000 tons capacity for producing formaldehyde from imported methanol have been licenced. It is readily seen, Mr Sapur comments, that the growth of plastics industry is closely linked with the development of basic chemical industries in the country.

Finished Articles

There has been a steady progress in the type and number of articles moulded and fabricated in India. In the beginning the consumer appeal was exploited by producing domestic articles such as combs, soap cases, toys, buttons and bangles, in colourful, transparent thermoplastics, and polystyrene in view of its low price became popular. Casein plastics were earlier used for making knitting needles and buttons, but due to the somewhat difficult nature of the process of manufacture they were soon replaced by other plastics such as cellulose acetate, UF resins and polystyrene. Amongst the goods now moulded are fountain pens, tooth brushes, spectacle frames, cables and flexibles, electrical accessories; polythene film, carboys, buckets, bottles and pipes; PVC-coated fabrics, unsupported PVC films and rigid PVC sheets; refrigerator parts, air conditioner grills, radio cabinets, telephone sets, gramophone records of polystyrene, polystyrene foam and sheets; paper and cloth base phenolic laminates. Imports of some of these items and other raw materials and semi-processed goods now manufactured in the country are greatly restricted. Today broadly speaking, about 2,250 tons of thermosetting powders are compression moulded, 4,500 tons of thermoplastics are injection moulded, 4,500 tons of thermoplastics are extruded and blow moulded, 1,400 tons are used in textile coating and calendering. It is proposed to expand these to capacities of 9,000, 16,000, 20,000 and 4,500 tons respectively by the end of the Third Plan period.

As yet, Mr Sapur says, plastics have so far found little use in such important fields as chemical industry, housing, communications, agriculture, defence requirements, surface coatings which today in other parts of the world constitute the bulk of demand for plastics.

Sole and Heel

At the annual general meeting of the Sole and Heel Manufacturers' Association held in London on March 23, F. H. Roberts (Dunlop Footwear Ltd.) was elected chairman for 1960-61. The new vice-chairman is W. G. Smith (Avon Footwear Sales Ltd.) and the treasurer is G. L. M. Etkind (Sussex Rubber Co. Ltd.).

Television control escutcheon injection moulded by UMP Plastics Division from brown high-impact polystyrene; the lettering is raised and hot-stamped in gold. The sunken border is also filled in with gold

VIEWS and REVIEWS

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **Dr Schidrowitz**

A Heat-resistant Fluorocarbon Elastomer

THE December 1959 issue of I/EC contains a paper by D. A. Stivers, F. J. Honn, and L. E. Robbi (Minnesota Mining and Manufacturing Co., St. Paul, Minn.) on a 'Fluid-Resistant Fluorocarbon Elastomer' for 'High-Temperature Operation,' which resists heat up to '600°F. compression set at 500°F., and loss of properties caused by normal swelling and deterioration, effect of many corrosive fluids at lesser temperatures.' (*Loc. cit.* 1465.)

It is expected that elastomers which are resistant to solvents and functional fluids at high temperatures will be increasingly important to the aircraft, automotive and chemical industries, etc., and this report describes a linear fluorocarbon (*Fluorel*) composed of vinylidene fluoride and hexafluoropropylene, which resists heat and compression set in the presence of destructive fluids.

Effect of Properties

'Because of its excellent mechanical properties and chemical resistance, this fluorocarbon elastomer is expected to find wide application in mechanical seals, fuel cells, fire walls, air ducts, fuel and hydraulic hose, sealants, diaphragms, liners and similar usage.'

Compounding and Processing

This linear copolymer is a highly fluorinated synthetic rubber designed for service at 400° to 600°F. with a wide variety of corrosive chemicals, synthetic fuels and functional fluids. Its composition and molecular weight are 'carefully controlled' to give a rubber that is easily processed in conventional equipment. This statement is supported by a table which, in abbreviated form, is as follows:

TABLE 1. TYPICAL RAW GUM PROPERTIES
(Conventional processing equipment can be used)

Sp. gr.	1.85
Colour	Off-white
Shore A hardness	40
Mooney-viscosity Ml-4/212°F.	135
Embrittlement temp. °F.	—50
Low. temp. stiffness ASTM D 1053-52	
Gehman	
T_2°F.	+15
T_5°F.	+ 5
T_{10}°F.	+ 2
Storage stability	Excellent
Solubility	Esters and ketones

A variety of parts have been made by compression and transfer moulding. As the press cure is essentially a forming operation in which the cure can be completed only to the point where the moulded piece has the dimensional stability required for removal from the mould, a wide range of moulding conditions is suitable. Ten to 30 minutes at mould temperatures of 280° to 320°F., followed by an oven cure of 24 hours at 400°F. are adequate for most parts. Mould shrinkage following post-cure will average 2%.

Vulcanization

The gum and its compounds can be cured by organic compounds, peroxides, and controlled irradiation. The most practical cures are those obtained by a blocked polyamine such as hexaminediamine (HMDA) carbamate along with various metallic oxide acceptors.

Stabilization

Particulars are given of stabilization; ten parts each of zinc oxide and Dyphos can be used during cure; but magnesium oxide is preferred because of its superiority to heat degradation.

Properties and Resistance

Resistance of the elastomer to a wide variety of hot oils, fuels, solvents, and strong inorganic bases and acids is excellent. Of particular interest is its stability to almost all of the fuels, lubricants and hydraulic fluids being used or developed for application in aircraft, etc. The long *Table of Resistance* to aircraft fuels and lubricants, etc., may be studied with profit. (This paper was accepted by the Division of Rubber Chemistry, Los Angeles, August 1959.)

Lucalox

In addition to the information contained in the issue of February 13 of *Chemistry and Industry* (p. 170, 1960) from which particulars appearing on March 19 were mainly culled, I am able to quote the remarks on this subject of Dr Guy Suits, Vice-President and Director of Research of the (US) General Electric (made in the same news release to the Press), as follows:

> 'For the first time in history a polycrystalline ceramic that readily transmits light has been made from powders. In addition to transmitting light, the new material possesses the extremely high strength characteristic of alumina ceramics, can withstand much higher temperatures than most ceramics now in use, and can be pressed into any shape desired. No other material combines translucence with this degree of strength, heat resistance and ease of fabrication.'

We shall hear more of this invention.

PHILIP SCHIDROWITZ

MEN and MATTERS

A Review of People and Events

by George A. Greenwood

THE spectacular figures published by Imperial Chemical Industries Ltd. have, of course, a tremendous amount of interest for many of us. What interests me, apart from the 'figuring' is the human element. Under the profit-sharing plan launched a few years ago, the value of the hand-out to the near 100,000 men and women workers grows enormously, because the distribution is in the form of shares in the combine and their market prices reflect naturally its prosperity. In other words, the allotment of 2,343,000 odd shares to represent the workers' part in the 1958 progress has since soared by nearly £3,500,000, a holder of each 100 shares of that issue now having a profit of more than £140. But this is nothing compared with the new share-out, by which the workers will enjoy, on present day market prices, a haul to the value of more than £7,000,000.

Holding On

These amazing results are an even greater temptation to the workers to sell, as they are perfectly entitled to do, than were the distributions which were made during the earlier stages of the scheme, but it will be recalled that Sir Alexander Fleck, then chairman, advised them to hold on. I have no precise figures available but I am told that since then, and especially during the past 12 months or so, more and more worker-holders have kept their interests. Today, a man who had £100 worth of shares two or three years ago, and resisted temptations to dispose of them, now finds that they are worth round about three times their original value, and if he holds them for any length of time, they will appreciate more, undoubtedly. The idea, undoubtedly fantastic, occurs to me, as a simple man, that the time could arrive when the workers own a preponderating share of the entire capital issue of I.C.I.

And while on this question of progress, just see how the textile concerns which are so closely linked with both rubber and plastics, boom. Storey Bros. and Co., of Lancaster, who specialize in printed plastic sheeting, report a profit increase of £340,000 to £980,000, and their dividend is up from 20% to 30%.

British Geon Ltd., which, as most of you know, is owned jointly by the Distillers Co. and B. F. Goodrich Chemical Co. of America, tells us that it is shortly to begin its £2,000,000 extension, already forecast, to its polyvinyl chloride plant at Barry, on the Glamorgan coast, and Shell Chemicals is to build a plant at Carrington for making new types of synthetic rubber. We don't know yet what it will cost, but surely the outlay will in the end total millions, and not much less will be involved in the ambitious project of the Witco Chemical Co., which is building a new plant in the Midlands (the exact venue is not yet decided), to make synthetic rubber latices, with an initial capacity of eight million lb. a year.

On Tyneside

Up in Newcastle the Metal Box Co. Ltd. is to lease a factory for its plastics group on the Newburn Industrial Estate. There it will make plastic containers, but a much bigger scheme is in hand—the purchase of a neighbouring site up to 10 acres on which to build a major factory to meet the constantly increasing demand for the Group's plastic products in the North.

But I leave one of the most impressive items in this category to the last, and then I will proceed to write about men, rather than matters. This is the Monsanto Co.'s 1959 statement. Last year, the company increased its net sales by £3,000,000 to £18,427,505. Profits were up from £1,318,949 to £2,265,635 and net earnings from £657,423 to £1,336,424. A final dividend of 10% lifts the total payment from 13½% to 15%.

The improvement in sales gathered momentum in the second half of the year, Sir Miles Thomas, the chairman, states, and the 1959 volume was easily a new record. The previous best was £15,683,272, in 1957.

Direct export business accounted for 37% of total sales, a contribution of £6,877,980 to turnover. During the year, the £3½ million polythene plant at Fawley was completed and went into production.

From Gruyeres to Brazil

Firestone tell me that Henri Dupre has been named manager of their plantation in Itubera, Brazil. He succeeds B. O. Vipond, who retired on April 1 after 30 years with Firestone. Mr Dupre, who has been with Firestone since 1954, started in the traffic department with the firm's plantation in Harbel, Liberia. In 1958 he became group superintendent of the company's plantation at Cavalla, Liberia, and remained in this position until being named to his present post.

As manager of the 3,000-acre plantation in Itubera, Mr Dupre will have charge of all production and administrative operations. A portion of this plantation will be ready for tapping this year, and all of the trees should be in full production by 1967. A native of Gruyeres, Switzerland, Mr Dupre, 38, was educated in Switzerland and he was employed in Canada before joining the Firestone Plantations Co.

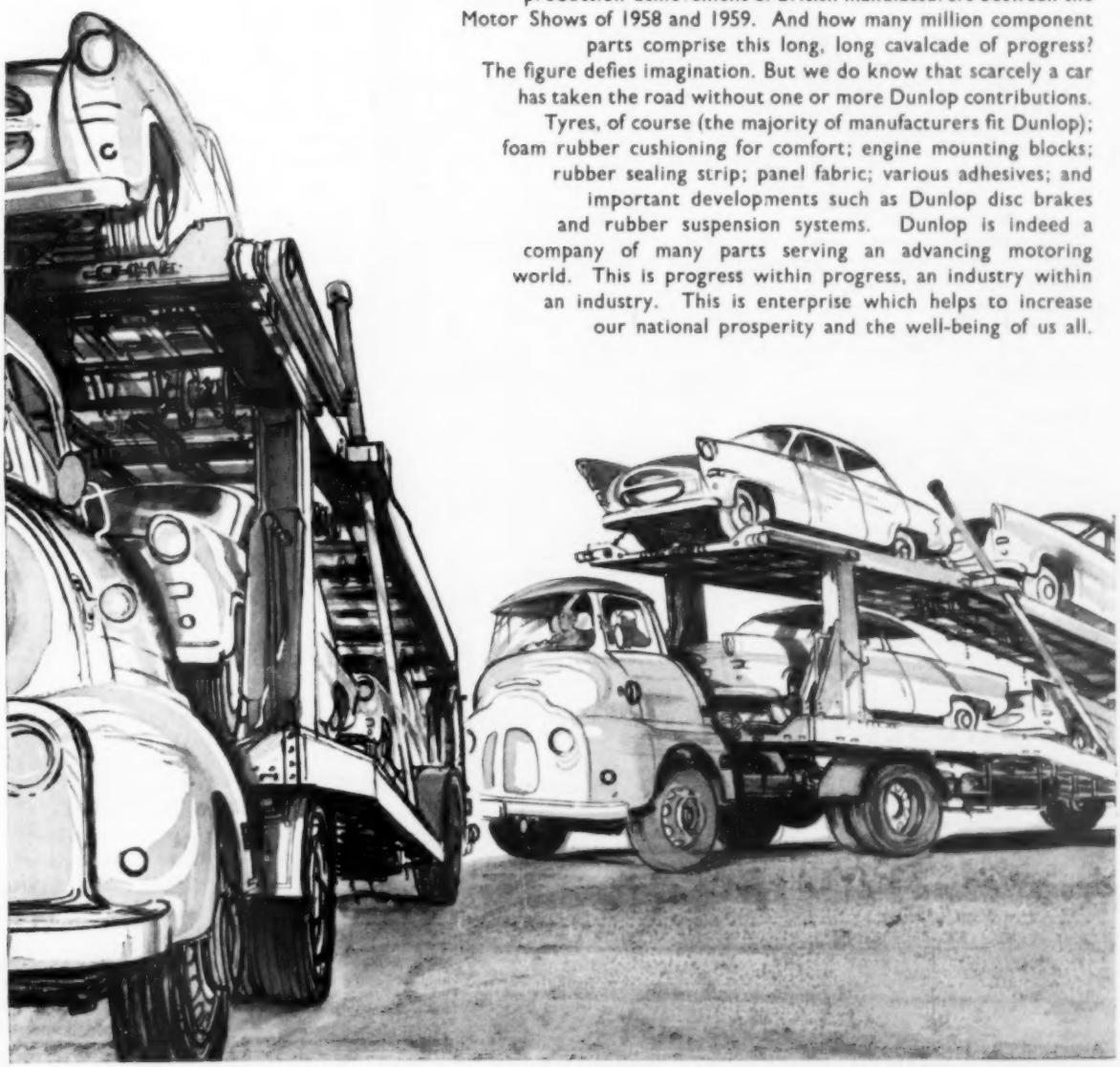
£100 to Boot

They seem to give prizes for everything these days—from thinking up quips to catching table-tennis balls in one's mouth on TV—but this is the first time I've heard of someone being given £100 for wearing rubber boots. He's Mr Ben Jones, of Pontllieu, Glamorgan, and in addition to the prize money he won in the John O'Groats to Land's End walk and the extra £100 presented by Billy Butlin, he has been given a cheque for a further £100 by the Dunlop Footwear Co. in recognition of his achievement in covering the whole distance in a pair of the company's Warwick rubber boots.

Mr Jones, who is 46, was fourth in the walk competition. He is employed by the South Wales Electricity Board as a patrolman and in the course of his work he walks at

COMPONENTS OF PROGRESS...

More than a million cars from the assembly lines . . . more than half-a-million for the export markets. That is the fantastic production achievement of British manufacturers between the Motor Shows of 1958 and 1959. And how many million component parts comprise this long, long cavalcade of progress? The figure defies imagination. But we do know that scarcely a car has taken the road without one or more Dunlop contributions. Tyres, of course (the majority of manufacturers fit Dunlop); foam rubber cushioning for comfort; engine mounting blocks; rubber sealing strip; panel fabric; various adhesives; and important developments such as Dunlop disc brakes and rubber suspension systems. Dunlop is indeed a company of many parts serving an advancing motoring world. This is progress within progress, an industry within an industry. This is enterprise which helps to increase our national prosperity and the well-being of us all.



DUNLOP MAKES THINGS BETTER FOR EVERYONE

TYRES, WHEELS, DISC BRAKES · AVIATION EQUIPMENT · ADHESIVES · FLOORING · FOOTWEAR · DUNLOPILLO · HOSE · BELTING
RUBBER MOULDINGS · DOMESTIC AND INDUSTRIAL RUBBER GOODS · CLOTHING · RAINWEAR · SPORTS GOODS, ETC.

CFH/PR6/6

least 15 miles a day examining overhead cable. Because of the distance he covers he acts as a 'guinea pig' and tests many types of rubber boots for the board. The Dunlop Warwick boots worn by Mr Jones during the Butlin walk had been issued to him a fortnight earlier and he decided to wear them, he said, because he found them so comfortable.

From £100 to £20,000

But, still reverting for a moment to this matter of expansion, there was an interesting announcement the other day to the effect that the Foley Plastics Manufacturing Co. Ltd., who are injection moulders at Westbourne Park Road, London, are increasing the capital from £100 to £20,000. This is quite a step up, and I asked Mr Norman Arthur Foley if he could tell me the reason why.

His company, he says, wants the money to cope with the increased demands for its products, which are supplied very largely to radio manufacturing concerns. It is clear that the company in six short years has made solid progress.

Changes

Another official announcement is that Mr A. D. Wenzel, who was appointed managing director of Firestone in England last July, has now been appointed chairman of the board of directors in this country. Although he is an American, and has been associated with it on the other side for most of the 27 years which span his career in its activities, he is well known in this country, and has many friends here. More about him, and a photograph, will be found in another part of this issue.

There is more re-organization on the staff side of I.C.I. Mr D. R. Mackay has been appointed regional manager of the Midland Sales Region in succession to Mr T. H. Minton who retires on March 31 after 28 years' service with I.C.I. and its predecessors.

Pedestrian Catchers

A lively correspondent, writing in one of the popular dailies from Belfast, has thought up a novel application for rubber. 'Why not give cars rubber bumpers?' he asks. This writer, Mr M. G. Grapes, points out that some months ago there was a great outcry against the use of sharp-pointed mascots on car radiators, and goes on:

> 'The trend of modern design, with its square front, projecting headlamps with "cheesecutter cap" peaks, pointed fins, etc., has made car outlines more and more aggressive.
>
> 'Will some designer have the courage to round off the corners a bit to help pedestrian morale. Or perhaps arrange a foot-thick rubber cushion in front instead of metal bumpers and over-riders.'

This is where some of the rubber accessories manufacturers, particularly those connected with the motor car industry, should obviously come in.

Isolating Heartbeats

The other day I came across a rubber product that can certainly claim to be versatile. This can be used to assist in the manufacture of more accurate balancing machines, in the extrusion of chemical threads to more exact tolerances—and even for the measurement of human heartbeats.

The product, made by Firestone (USA) is called Airmount, and its job is to isolate machinery from shock and vibration. Briefly, it is an air spring system of rubber-nylon bellows which, when inflated with air, acts as an insulator against the transmission of vibration.

One of the most spectacular uses of Airmount is in a hospital where an entire room has been mounted on this system. Here, in this 'floating' room, free from traffic noise, and even from the slight rumble of a lift, ultra sensitive equipment is used to measure the human heartbeat.

Mr B. G. Bishop

I am sorry to record the death recently at his home in Woodford Green, Essex, of Mr Benjamin George Bishop, at the age of 89. For many years he was well known, and is still remembered, for his association with the India Rubber Co. at Silvertown, and his connexion with various associations in the industry.

Question Corner—111

(Second Series)

436. Acrylonitrile is used in the plastics industry. Give details.

(Answer next week)

Answer to Question Corner—110

435. Polyvinyl alcohol fibres are obtained both by extrusion of a moulding compound and also by spinning an aqueous solution into a precipitating bath containing a salt (*e.g.* ammonium sulphate) or an organic non-solvent (*e.g.* acetone), followed by stretching. The filaments are then treated with an acid chloride so as to improve their resistance to solvents and moisture.

In another process vinyl acetate is continuously polymerized in a methanol solution, using a peroxide initiator. The solution of polyvinyl acetate is continuously converted into polyvinyl alcohol by caustic soda. The precipitate is filtered, washed and dried. The polymer is then dissolved in warm water to produce a spinning solution, which is wet-spun. The treatment for giving water resistance to the fibre is accomplished in the coagulating bath, which contains formaldehyde, sulphuric acid and sodium sulphate.

Subsequent treatments give the fibre the appearance of silk, cotton or wool. It is strong, abrasion resistant and with good dyeing properties. Its water absorption is high (about 30%). Unfortunately its wet-heat strength resistance is not very good and ironing becomes a problem.

Polyvinyl alcohol fibres have been used as surgical sutures and as supporting threads in lace manufacture.

(Another question next week)

Polly Ester Says . . .

'De-flocculation — More spring lambs on the menu'

Tested every foot of the way

Resin rubber compounds incorporating Microcal or Alusil gave tensile and tear strength values exceeding 1,500 p.s.i. and 600 p.s.i. respectively at 80 to 90 loading when tested in accordance with B.S. 903 on a Hounsfield Tensile Testing Machine.

Crosfield regularly evaluate the performance of Alusil and Microcal in rubber compounds: such tests demonstrate the desirable properties which these white reinforcing fillers give to a wide range of end products in which impressive tensile and tear strengths are matched by good compression set, extremely high resistance to cut growth and satisfactory hardness.

Crosfield CHEMICALS

ALUSIL* & MICROCAL*

aluminium and calcium silicates of millimicron ultimate particle size

You ought to find out more about these reinforcing fillers—made by us at Warrington: details of them will be sent to you immediately if you write to the address below.

CROSFIELD MANUFACTURE SILICATES FOR INDUSTRIAL USES

Joseph Crosfield & Sons Limited, Warrington, Lancashire.
Telephone: Warrington 31211

London Office: Hesketh House, Portman Square, W.1. Telephone: Welbeck 4466

Glasgow Office: 183 Pitt Street, Glasgow, C.2. Telephone: City 4902/3

CML 33-7256-180

★ Registered trade marks

Companies in the News

I.C.I.

Group sales for 1959 were £509m.—an increase of £46m. on 1958. Total dividend is increased from 8% to 11¼%. The fob value of exports increased by £13.7m. to £87.5m.

After providing £33.14m. (£29.58m.) for depreciation and a biggest ever £7.1m. (£5.4m.) employees' profit-sharing bonus, group income rose by 28.61m. to 73.12m. After tax, less over-provisions, the group net profit of £41.58m. compares with £23.85m.

The meeting will be held on May 12.

Offer for Lanadron

Following merger negotiations, London Asiatic Rubber and Produce made a share exchange and cash offer for the £607,543 capital of Lanadron Rubber Estates, worth over £2m., or 6s. 8½d. per 2s. Lanadron share, based on the current price.

The offer, made with the full approval of Lanadron's Board, is three London Asiatic 2s. shares, plus 1s. 4d. cash, for every four Lanadron shares.

Last year Lanadron had a total planted area of 14,468 acres, which included 4,652 acres of mature pedigree stock. Their estimated 1959 profit (before tax but after allowing for replanting expenditure of £51,800) is £240,000.

Marchant Heyworth and Swift

Following the death of R. P. Marchant (chairman and managing director), Marchant, Heyworth and Swift, dealers and suppliers in rubber, announce that they have merged with Hecht, Levis and Alcan Ltd. As from April 1 the firm will trade under the title Hecht, Heyworth and Alcan Ltd., and the address will be 3 Mincing Lane, E.C.3.

Monsanto Chemicals

Sales of Monsanto Chemicals showed a vigorous and broad-fronted expansion in 1959 and the upsurge in activity was also reflected in export business which made a notable contribution to the record turnover of £18.4m., beating the previous highest figure of 1957 by £2.7m., says Sir Miles Thomas, chairman.

Direct exports, with a net total of £6.88m. represented 37% of all sales and compared with £5.43m. for 1958. The active trend appears likely to continue into 1960.

New plant is being built, and the expansion of output of several major products is being planned.

During last year expenditure on capital projects totalled £1,964,273, compared with £3,461,106 for 1958. This reduction is a measure of the progress made in the completion of the major construction programme at the new Fawley factory. As at December 31 last, commitments totalled £1.21m.

Plastics operations, stated Sir Miles, showed a 'remarkable growth' during 1959. Polythene from the new Fawley factory has been added to polystyrene from Newport, providing healthy diversification in that field. The great activity of the car industry was reflected in sales of rubber chemicals, which established a new high record.

Group net profits, as stated earlier, advanced to £1,693,266. The meeting will be held on April 11.

BTR Sell Spalding

Under its reorganization programme, the Board of BTR Industries is to dispose of the share capital and control of its sports goods subsidiary, A. G. Spalding and Bros., of Putney, to A. G. Spalding and Bros. Inc., of Chicopee (Mass.) to whom the company formerly belonged.

This transaction includes the ownership of A. G. Spalding and Bros. (Australasia) Pty., A. G. Spalding and Bros. (South Africa) Pty. and Robert Forgan and Son, of St. Andrews. Spalding will continue to manufacture both in Great Britain and Australia.

The BTR Board states that the proceeds of the sale will be employed in fields more closely allied to the group's industrial activities.

Montecatini Profit Up

After providing for depreciation of fixed assets in the amount of 14,500,000,000 Lire or $23,387,096, Montecatini's net profit for the year 1959 amounted to 12,412,199,497 Lire ($20,019,676), it was declared in Milan on March 22. This compares to a net profit of 10,847,738,689 Lire ($17,496,352) in 1958 and is an increase of about 14.3%.

A dividend of 115 Lire per Italian share of 18.5c. was proposed for the next stockholders general meeting to be held on April 29. One American share of Montecatini stock equals five Italian shares, and therefore the per share dividend for American shares would be about 93c.

Revertex

At the annual general meeting of Revertex Ltd., the chairman, T. Harcourt Powell, referred to the wide range of products manufactured by the group. He said that deliveries of Revertex grades have increased and that a new Revertex factory may be established in Malaya, sometime in the near future.

Sales turnover of Emultex (polyvinyl acetate emulsion) has gone up, he said, and the many technical problems which arise in producing particular brands of Alcotex (polyvinyl alcohol) were being surmounted.

During the year the Harlow factory was extended, and arrangements were made for compounds based on the company's products to be manufactured in a number of other countries. As reported earlier (*RJIP* March 5) profit before tax was £415,433, compared with £397,373 the previous year.

British Standards

Testing Rubber

BS 903, 'Methods of testing vulcanized rubber' is now being revised, and the BSI have just published Parts B11 and B12 bound in one volume. B11 covers the calculation, and B12 the determination of rubber (polymer) content. The main difference between these parts and the previous edition is that the direct determinations have been brought up to date. Also a new method covering the determination of total rubber hydrocarbon (for natural, butadiene - styrene, and butyl rubbers) has been included.

There are detailed descriptions of the reagents required, apparatus, procedure and expression of results. Methods are provided for the evaluation of: natural rubber hydrocarbon, nitrogen (for acrylonitrile copolymers), chlorine (for chloroprene polymers and copolymers) and total hydrocarbon rubber (for natural, butadiene-styrene and butyl rubbers).

Butadiene Acrylonitrile

This new standard specifies requirements for vulcanized butadiene/acrylonitrile rubber with a particularly low compression set, used for mechanical and electrical purposes. The hardness of the rubber is within the range 51-60 BS rubber hardness degrees. Mechanical and electrical grades are specified.

The standard, which is based on the use of a butadiene/acrylonitrile copolymer with a medium nitrile content, provides full details of composition, together with test requirements and procedure. The foreword states that the vulcanizates are primarily intended to meet the requirements of Government Departments for many of their items in which resistance to certain organic liquids together with low compression set are necessary properties.

The address of the British Standards Institution Sales Branch is 2 Park Street, London, W.1.

P. B. Cow Sale

Negotiations are proceeding with a view to the sale of one of the company's subsidiaries. If these negotiations are fruitful, as would appear likely at the moment, it will have the effect of delaying publication of the preliminary figures and therefore, obviously, of the final accounts for some weeks. Nevertheless, the directors are confident that they will be in a position to recommend a dividend at the same rate as last year. The 1958 final dividend was 7½%.

COMPANY MEETING

Anchor Chemical Co. Ltd.

ONE FOR TWO ISSUE APPROVED

Mr Thomas Martin Reports Record Sales

THE 53rd Annual General Meeting of the Anchor Chemical Co. Ltd. was held on March 30 at the Registered Office, Clayton Lane, Clayton, Manchester, Mr Thomas Martin, F.I.R.I., chairman, presiding.

The following is his statement which had been circulated with the report and accounts for the year ended November 30 1959:

I have pleasure in presenting the Directors' report and the statement of accounts for the year ended November 30 1959.

I hope you will approve the amended form in which the accounts are presented. The arrangement is a little more expansive and is in keeping with the modern trend to facilitate an appreciation of the position. The Directors have also decided to issue this year and in subsequent years a report on the first half-year's trading and expect to make the announcement during August.

Before commenting on the figures, I congratulate two members of the Board on the honours conferred upon them. Our Export Director, Mr T. C. Hewlett, received the C.B.E., and Mr J. H. Carrington, our Technical Director, was awarded the Hancock Medal for 1959 by the Institution of the Rubber Industry.

Trading Figures

The consolidated trading profit before taxation is £164,362, an increase of £23,949 over the previous year. Taxation based on the profits for the year is £74,924, against which we have a credit of £5,368 for taxation provision last year no longer required mainly due to the change in the standard rate of income tax.

The group net profit after taxation (and after deducting minority interests) is £93,576 (£71,559). The unappropriated group profit brought forward was £151,320 and after deducting dividends already paid there is a disposable balance of £233,871.

Your Directors recommend the payment of a final dividend of 15% (less income tax) on the Ordinary Shares absorbing £24,806, and making a total of 20% for the year, an increase of 2½%. It is intended that the interim and final dividends for the next trading year shall be adjusted so as to bring the percentages into closer relation.

A transfer of £35,000 is recommended to General Reserve out of unappropriated profits to increase the total of the General Reserve to £135,000 which is the amount required for the proposed capitalisation issue referred to below. The remaining balance of undistributed group profit to carry forward will be £174,065.

The shareholders have received a notice convening an Extraordinary General Meeting (to be held immediately after this meeting) at which resolutions will be submitted to increase the authorised share capital and to issue to the existing Ordinary shareholders, by way of capitalization of reserves, one new fully paid Ordinary Share for every two Ordinary Shares held. The Board recommends this step to bring the issued Share Capital more into line with actual capital employed in the business.

Year's Activities

Apart from the major strike in the printing trade the year was substantially free from industrial troubles and enabled us to maintain a steady period of trading. Sales of our products throughout the year reached the record figure of over £6,000,000 sterling.

Carbon black is still one of the main raw materials used in the rubber industry. We are experiencing competition from new producing units in many countries of the world but our sales have been maintained. Extra production is expected from the plant at Swansea during the second half of 1960 and we plan to improve our position. United Carbon Co., whose production in the USA of Dixie grades of carbon black we have sold throughout the world for more than 30 years, have entered into manufacture in Australia and have lately announced plans to manufacture in France. This will of necessity reduce our own sales in Australia. The position in France has not yet been clarified.

Cycolac, the high impact thermoplastic ABS resin, referred to last year, has been well received and sales are increasing steadily. We made a special feature of it at the Plastics Exhibition at Olympia in June and much interest was created.

Our production of curing agents for synthetic resins has progressed steadily and sales have shown an increase of more than 50%. New types have been developed and successfully introduced. We continue to install multi-purpose plant to permit development in diverse fields of chemical manufacture. The annual tonnage produced continues to increase. Products from this plant include Pepton 22, a peptizing agent for rubber, and a range of Ty Ply products for bonding rubber and metal.

The decision referred to last year, to enlarge the Latex and Dispersions Department, proved fully justified because the extra production capacity was needed immediately; sales of dispersions have gone rapidly ahead. To deal with this expanding business enlarged research and control laboratories will now be needed, and a scheme is being formulated.

Increased Export Sales

It is also very gratifying to report that our export sales have increased by a large margin. Despite extremely keen competition, both in price and credit terms, we are extending our sales over a wide range of materials. Much of this success is directly attributable to the support given to our agents overseas by our own personnel and as these notes are being compiled our Export Director, together with one of our senior technical executives, is undertaking a series of visits in many parts of Eastern Europe, the Far East and Australia.

British Anchor Chemical Corporation in New York still make an important contribution in maintaining good relations with manufacturers in the USA, whose production we distribute throughout the world and in ensuring that we give good shipping and after-sales service. They are also very helpful to any of our customers who care to take advantage of their facilities when visiting the USA.

Prospects for 1960

With regards to our prospects for 1960, everything depends upon the maintenance of peace both industrially and internationally; given reasonable stability we see no reason why we should not play our full part in a further year of improved trading. Through our great interest in the rubber trade we look forward to participating in the expansion of the motor car industry arising from the new factories now being planned in the UK.

Once again the Directors wish to record their appreciation of the valued help received, at home from the personnel who form various advisory committees and panels, and abroad from our many agents. The usual welfare schemes for the benefit of the employees continue and we should like to thank all those who have, in any way, helped in this successful year.

The report and accounts were adopted; the payment of a final dividend, as recommended, was approved, and the retiring directors, Mr J. H. Carrington, B.Sc., F.R.I.C., F.I.R.I., and Mr T. C. Hewlett, C.B.E., M.A. (Cantab), were re-elected.

Brains Trust

DISCUSSION ON STATUS OF API

WHAT does the panel think is the standing of the API in the plastics industry? This was one of the more pertinent questions asked at the Plastic Institute's (London Section) Junior Brains Trust, held at the National College of Rubber Technology on March 15. Members of the panel were Dr M. Kaufman (NCRT), C. T. Coward (Bakelite), Dr C. L. Child and G. L. Campbell (I.C.I.), F. T. Walker (Fraser and Glass), and the meeting was ably handled by Dr J. Gadsby, chairman of the London section.

The status of API gave rise to a number of questions, besides the one quoted. Dr Gadsby thought that since the industry was such a broad one, stretching from chemists to merchants, the usefulness varied throughout this spectrum, perhaps proving most useful to the fabricator.

Dr Child, who sits on the examination committee of the PI, said that the API had the merit of having one foot firmly in industry. The emphasis was on practical and commercial considerations, and he agreed that the qualification was most useful in the middle part of the spectrum—where the plastic was tortured into the finished article.

It was essentially a post-war qualification and had already gained recognition from the Ministry of Education as being equivalent to an honours degree. The quickness of the recognition had surprised some educational experts.

Dr Kaufman said that there was not much scope for an API from a raw material producer's point of view—Dr Gadsby interjected that they grew their own—but he thought that there should be a fair amount of scope in technical sales and development work.

A student said that, looking through the 'sits vac,' it appeared that the plastics industry wanted chemistry and engineering graduates, and not APIs. Dr Child replied that this was because the qualification was so new at the moment. There were only 120 APIs in the whole country: not many to advertise for. The new route to API—granting the qualification to people of a certain standing in the industry—was helping to publicize the qualification. General recognition was now almost entirely a question of publicity.

Earlier, a number of questions had been asked about injection moulding. One questioner wanted to know the life of a screw in a single screw preplasticizing injection moulding machine. Mr Coward said that it depended on the material being moulded, and Mr Walker added that he knew of a machine that had been running for 10 years without replacement of screw or barrel. It depended to a good extent on how much heat was generated.

A student asked about the light stability of polyacetals, and about their comparative cost. Mr Campbell replied that he couldn't comment on the cost, but the reluctance to use polyacetals in applications where they would be exposed to direct sunlight suggested that some decomposition took place. Dr Gadsby added that use in textiles had meant an economic level for nylon, it remained to be seen whether a big outlet could be found for the acetals.

A wide range of other questions—including the story of the acrylic bath—were ably handled by the team. There were, however, a few that stumped them, which made one member of the large audience wonder how Junior was a Junior Brains Trust.

Henry Robert Quartley

Harry Quartley, 'Q,' whose death occurred at his home at Pagham, Sussex, on March 11 1960 at the age of 81, left a fine record of personal achievement and service to the rubber planting industry. In 1897, at the early age of 18, he went to Ceylon and learned tea planting and later was transferred to a tea estate in Travancore. His abilities attracted the attention of Sir Leybourne Davidson who sent him to Malaya in 1903 where he became one of the pioneer rubber planters and opened up Seafield Estate. In those days malaria was a real killer and 'Q,' working with the late Sir Malcolm Watson, initiated on Seafield Estate the first successful attempt at malarial control by means of subsoil drainage and oiling. He was meticulous in detail and set the very highest standards in his profession, becoming an acknowledged expert in the growing and harvesting of rubber and in handling labour. He joined Whittall and Co. as visiting agent in 1913 and was subsequently appointed to a similar position with many other agency houses.

In 1920 he left Malaya when he was invited to join the boards of a number of rubber companies, including his beloved Seafield. He joined the Rubber Growers' Association in 1921 and was a member of its Council until he resigned in 1958. Until shortly before his death he was a director of some 20 companies, being chairman of several of them. In 1953 he saw Seafield become the pivot on which several of his companies were amalgamated.

His son went to Malaya to learn planting on Brooklands Estate in 1936. His death as a prisoner of war at the hands of the Japanese caused great grief to his family.

'Q' was a man of outstanding and generous character who, by his ability and integrity, worthily served the rubber planting industry both during his years in Malaya and as a company director after his retirement. He will be sadly missed by his many friends and especially by those with whom he worked and to whom he gave his unstinted help and advice when needed.

In 1912 he married Vera Isobel Whitehead of Pool-in-Wharfedale, who survives him with their daughter.

—W. H. G.

Firestone's New Chairman

A. D. Wenzel, who was appointed managing director of Firestone in England last July, has now, in addition, been appointed chairman.

He joined Firestone in 1933, working in the sales department of the Milwaukee Branch. After working two territories he was made manager of the Firestone auto supply and service store in Green Bay, Wisconsin. In 1938 he went into the export division — and the year after that found him in India; he became assistant sales manager of Firestone India in 1940. In 1945 he was made managing director. Altogether Mr Wenzel spent 20 years in India.

A. D. WENZEL

He is married, with two children, and includes among his hobbies golf, photography (both still and cine) and shooting.

Write for details of the—

Mix-o-matic

INTERNAL MIXER

Special features include Two-Speed Gear Box for RUBBER or PLASTICS.

Output 120 lbs crude rubber in 4 mins
280 lbs batch in 8 mins.

Can be inspected in actual production.

LATEX ENGINEERING COMPANY

VICTORIA STREET, DROYLSDEN, MANCHESTER

Telephone: Droylsden 1251 Telegrams: Washer, Droylsden

LONDON OFFICE: 4 CLEMENTS INN, W.C.2

Telephone: Chancery 2401-2 Telegrams: Plastrub, Estrand, London

---

We supply...

Pre-Vulcanised Latex

Reclaim Dispersions

Colour Dispersions

Vulcanising Dispersions

NATURAL AND SYNTHETIC LATEX COMPOUNDS

RL

RUBBER LATEX LTD. Harling Road, Wythenshawe, Manchester.

Telephone: Wythenshawe 3226/7/8. Telegrams: Compounds, Manchester.

London Office: St. Dunstan's House, Idol Lane, London E.C.3. Telephone Mansion House 1005.

Rubber Statistics

JAPAN AND SARAWAK

THE latest bulletin issued by the Secretariat of the International Rubber Study Group contains details of the rubber position in Japan and Sarawak up to the end of October last.

In the case of Japan, imports of natural rubber during these months totalled 115,617 tons of crude and 13,242 tons of latex, the total of the two amounts, 128,859 tons, showing an increase of nearly 25,000 tons over the previous year's figure. Once again, Malaya was the main supplier, sending 97,160 tons, while British North Borneo sent 9,827 tons, Ceylon 7,976 tons, Thailand 8,917 tons and Indonesia 2,962 tons.

Consumption of natural rubber during these months totalled 120,510 tons of crude and 11,730 tons of latex, representing an increase of about 28,500 tons compared with the previous year. Stocks at the end of October had fallen to 11,699 tons, having stood at 15,079 tons at the beginning of the year.

Imports of synthetic rubber during these months amounted to 33,617 tons, compared with the 1958 figure of a mere 13,208 tons. Of this amount, the USA supplied 29,488 tons and Canada 3,388 tons; almost all the increase was in fact represented by imports from the former source. Consumption of synthetic amounted to 24,730 tons, compared with 13,280 tons, and stocks at the end of October totalled 11,938 tons, having stood at 3,050 tons at the beginning of the year.

Sarawak

The Secretariat of the International Rubber Study Group has now released details of the exports from Sarawak during the last quarter of the year. These totalled 11,912 tons, and brought the year's exports to 43,930 tons, an increase of nearly 5,500 tons or some 15% compared with 1958.

Singapore took the bulk of these exports, with 35,831 tons, and was followed by Japan, taking 5,935 tons, and Hong Kong taking 1,798 tons.

Neutron Shield

Polythene radiation shields, so thick that they must be cut by specially designed saws, are being produced for use on atomic powered vessels by Panelyte Division, St. Regis Paper Co., Richmond, Indiana.

According to Panelyte engineers, these polythene panels provide excellent protection from neutron bombardment, while, of course, being of much lower weight than conventional materials such as concrete and lead. Petrothene 100, a polythene resin supplied by US Industrial Chemicals Co., is used to make the panels. Panelyte say this material passes all military specifications for radiation shielding. The resin permits extrusion of panels having extremely high surface smoothness and gloss, and uniform thickness. These factors are important during installation where many thicknesses may be fitted together, demanding no voids or holes for best neutron protection.

The panels are made by a specially adapted extrusion technique which allows Panelyte to produce heavy gauge sheets ranging between $\frac{1}{8}$ and over 1in. The shields can be made in standard widths over 36in. wide and may be cut to any length according to specifications by special saws.

Hungary will export to Tunisia rubber goods under the terms of a trade agreement for 1960 signed between both countries.

Regal Blacks

CABOT ANNOUNCE PRICES

THE new family of oil furnace carbon blacks, introduced by Cabot Carbon Ltd., will be known as Regal blacks. These will be of great interest to the rubber industry. Their unique properties are outlined in *RJIP* 'Industry Intelligence' feature on page 523.

Regal 300 is already in production at the Stanlow, Ellesmere Port plant of Cabot Carbon Ltd., and Regal 600 will be available shortly. Technical information and samples will be supplied on request. The prices of these grades are as follows:

Regal 300 ... 8d. per lb.
Regal 600 ... 10d. per lb.

Prices nett, ex works Stanlow, in minimum 3 ton lots. Smaller quantities—$\frac{1}{4}$d. per lb. extra.

Pearns have made a new speedboat fabricated from glass-fibre Duramat supplied by Turner Bros. Asbestos which carries 12 passengers and develops over 30 mph.

Book Reviews

INDUSTRIAL ACCIDENTS. (Published by the NJIC for the Rubber Industry, 236/237, Royal Exchange, Cross Street, Manchester 2.)

The booklet consists of reprints of leaflets on industrial safety prepared by Mr R. W. Lunn, chairman of the Leyland and Birmingham Rubber Co. Ltd., who is also chairman of the NJIC Accident Prevention Committee for the Rubber Industry.

The effect of the arrival of one leaflet every week for 52 consecutive weeks during 1958 and 1959 was considerable—and cumulative; compound interest rather than simple. The impact of the book, which collates all the leaflets and adds a preface, is, if anything, greater than the sum of the parts. It is a work of great value written naturally, sincerely and forcefully by a man whose realization of the importance of the work for safety is deeper than that of most of us.

It is typical of Mr Lunn, who is nothing if not positive, that throughout the years his untiring efforts in this field have been always 'for' safety rather than 'against' accidents. It must be a source of satisfaction to Mr Lunn and the Committee that a considerable number of requests for the book have been received from other industries. It is only to be expected that this should be so for the NJIC, as Dr J. G. Mackay, chairman of Francis Shaw and Co. Ltd., remarked recently, the NJIC for the Rubber Industry has led the world in making machines safe. The book should be in the hands of everyone in the industry.

TRADER HANDBOOK 1960. (54th Edition. Published by Trader Publishing Co. Ltd. 762 pages, 21s. net.)

This handbook is a legal, technical and buying guide to the motor, motor cycle and car trades. Technical information in the handbook includes specifications of all types of motor vehicles and servicing data for cars and goods vehicles. Comprehensive buyers' guide names manufacturers of components, accessories and transport service equipment bought and sold, while the proprietary names section identifies the makers of over 5,000 branded goods.

Included with a mass of general information are oil producers' grades; spares, repairs and specialist services; trade associations; index of vehicle registration numbers; motor cycle cable data; motor cycle and cycle lamp bulbs; brake lining dimensions; bicycle hub dimensions; cycle repair charges. Wholesalers are given in lists arranged alphabetically and territorially.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

EVERY TYPE OF

CALCIUM CARBONATE

Whether you call it —

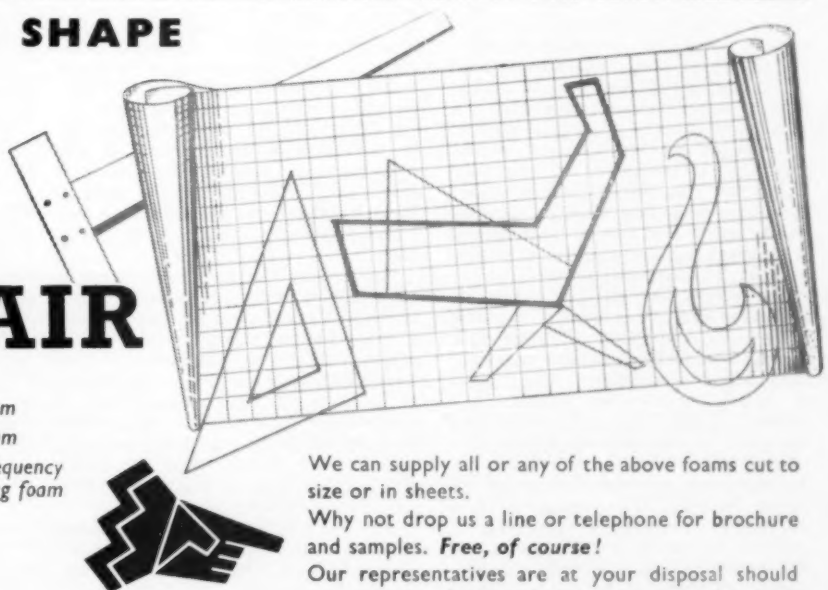
ACTIVATED WHITING
PRECIPITATED CHALK
LIMESTONE FLOUR

Is available in our range for Rubber or PVC

WITCO CHEMICAL CO., LTD.

Head Office: **BUSH HOUSE, ALDWYCH, LONDON, W.C.2**
Telephone: TEMple Bar 6473/6476
PEARL HOUSE, PRINCESS ST., MANCHESTER 2 (Central 9066/8) 62 ROBERTSON ST., GLASGOW, C.2 (City 3495)
FACTORIES, LABORATORIES AND SALES OFFICES—
U.S.A. · CANADA · GT. BRITAIN · FRANCE · HOLLAND

TO FIT THE SHAPE OF THINGS TO COME!!



FOAMAIR

POLYESTER . . . *all purpose foam*
POLYETHER . . . *cushioning foam*
VINYL (*FOAMAIRA*) . . . *high frequency welding foam*

We can supply all or any of the above foams cut to size or in sheets.
Why not drop us a line or telephone for brochure and samples. ***Free, of course!***
Our representatives are at your disposal should you require further information regarding the possibilities of these versatile, inexpensive, filling materials.

FOAMAIR LTD.

ST. ALBANS PLACE · UPPER ST. · ISLINGTON · N.1
Telephone: CANonbury 4025-4530

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Extruding Thermoplastics

No. 825,863. Alpine Aktiengesellschaft Maschinenfabrik und Eisengiesserie. Inventor: E. Beck. Application and Filed, October 11 1956. Application in Germany, October 18 and November 7 1955. Published, December 23 1959.

In an extruder for thermoplastic materials, the whole of the energy required for plasticizing the material in the extruder is obtained in a way already known by converting mechanical energy to heat. However, instead of basing the control of the energy supply upon the temperature of the plasticized material, control is effected by changes in the viscosity of the material, a condition of operation being that the rate of feed is smaller than the theoretical delivery capacity of the screw and the screw rotates at a constant high peripheral velocity of at least 0.4 metre per second.

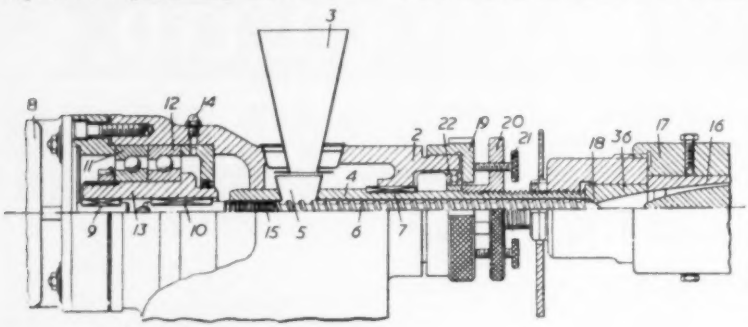


Fig. 1

As shown in the accompanying drawing, the thermoplastic material is fed into a hopper 3 mounted on a casing 2 and thence into a hopper 5 (fastened to a bushing 4) from which it passes around the threads of a screw 6. The bushing 4 is slidably mounted in casing 2 by means of a sliding key 7, which is keyed-in or arranged to transmit the torque of screw bushing 4 to casing 2, thus preventing rotation of bushing 4 relative to casing 2, but permitting the screw bushing 4 to move independently of screw 6 in a longitudinal direction. The screw 6 is driven by a high speed motor 8, the torque of which is transmitted to the screw 6 by means of wedges or keys 9 and 10 and a hollow cylindrical coupling part 13 located in casing 2 and mounted on ball bearing units 11 and 12.

A throttle 18 is formed by the discharge end portion of the screw 6 beyond the end of the threads, this end portion being of oval shape or substantially conical and forming an adjustable gap with a surrounding member 36 which is held in fixed position relative to the bushing 4 between the discharge end of the bushing and the adjacent end of the outer casing of a nozzle 16, mounted in extrusion head 17. The extrusion head assembly is mounted on the bushing 4 and is movable therewith to permit the gap of throttle 18 to be adjusted.

The thermoplastic material is fed to the threads of screw 6 at a rate of feed which is smaller than the theoretical delivery capacity of screw 6. It is placed under pressure inside the bushing within the last threads of the screw and is heated by the conversion of mechanical energy to heat due to the friction of the thermoplastic material between the screw head, the inside of the throttle 18 and between the last threads of the screw 6 and the interior of the bushing 4.

For driving the screw, use is made of a motor with a constant high number of revolutions per minute (*e.g.* a pole changing three phase current motor with squirrel cage rotor). The screw absorbs from the driving motor at all times as much energy as is required for its rotation. Should the viscosity of the thermoplastic material undergo any change, then the screw will take up more or less energy from the driving motor.

The extruder has a high output and figures are given for the output obtained with high-pressure polythene, low-pressure polythene, PVC, polystyrene, polyamide and cellulose acetate.

Shorter Abstract

Polymers containing Phosphorus. 825,767. United Kingdom Atomic Energy Authority. Filed, October 5 1955. — Polymers and hydrolyzed polymers of di-allyl allyl phosphonate are claimed.

Rubber Crop Returns

Unless otherwise indicated the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.

HARRISONS AND CROSSFIELD

February

Bukit Kajang.—106. 2 mths—217.
Castlefield.—243 (200). 8 mths—2,170 (1,880).
Golden Hope.—695 (648). 12 mths—8,893 (7,920).
Holyrood.—84 (63). 2 mths—186 (144).
Hongkong.—30 (26). 2 mths—63 (55).
Hoscote.—237 (225). 8 mths—1,927 (1,969).
Killinghall.—45 (45). 8 mths—358 (351).
Kuala Selangor.—58 (56). 2 mths—129 (116).
Kulai.—164 (185). 4 mths—696 (812).
Lanadron.—385 (347). 2 mths—844 (802).
London Asiatic.—1,480 (1,331). 2 mths—3,243 (3,001).
Malaysia.—59 (42). 2 mths—127 (100).
New Crocodile.—224 (217). 12 mths—2,830 (2,866).
Pataling.—1,195 (985). 4 mths—5,535 (4,760).
Prang Besar.—301 (199). 11 mths—2,911 (2,101).
Sandac.—83 (81). 11 mths—866 (836).
Sapong.—150 (137). 2 mths—303 (282).
Seaport.—78 (69). 8 mths—591 (634).
Malayalam.—45 (2). 11 mths—6,824 (6,700).
Lunuva.—89 (94). 2 mths—210 (227).
Allied Sumatra.—772 (719). 2 mths—1,559 (1,600).
Asahan.—90 (108). 7 mths—701 (858).
Bah Lias.—150 (154). 4 mths—633 (668).
Central Sumatra.—75 (86). 8 mths—577 (742).
Lankat Rubber.—82 (57). 11 mths—770 (685).
Mendaris.—183 (190). 2 mths—370 (406).
Namoe Tongan.—256 (254). 6 mths—1,464 (1,627).
Sialang.—212 (187). 1 mth—212 (187).
Soengei Rampah.—46 (51). 2 mths—91 (108).
Tanah Datar.—68 (66). 2 mths—136 (148).
Tandjong.—151 (143). 8 mths—1,296 (1,223).
Toerangie.—225 (187). 4 mths—831 (858).
United Lankat.—35 (26). 2 mths—67 (58).
United Serdang.—875 (793). 6 mths—5,442 (5,694).

January

Bajoe Kidoel.—242 (273). 10 mths—2,025 (2,169).
Djasinga.—96 (117). 7 mths—717 (810).
Anglo Johore.—37 (38). 8 mths—237 (242).
Bekoh (CRE).—187 (169). 12 mths—2,346 (2,219).
Rim Malacca (RE).—202 (181). 9 mths—1,851 (1,806).
KPRP.—65 (62). 12 mths—682 (597).
Kurunegala.—22 (22). 2 mths—50 (50).
Sittang Valley (RE).—117 (109). 9 mths—839 (887).

Synthetic Rubber Prices

Prices of synthetic rubbers appear regularly in RUBBER JOURNAL AND INTERNATIONAL PLASTICS *in the first week of each month. It will be appreciated if suppliers will give notification of any price changes or additions to their range. Cif duty paid quotations are subject to slight variation due to exchange, ocean freight and insurance fluctuations. Prices are in pence per lb., except where otherwise stated.*

(e-qdp)—Ex-quay duty paid (cifUKdp)—cif UK duty paid (e-i)—Ex-installation (ddp)—Delivered duty paid (e-sUK)—Ex-store UK (ex-wUK)—Ex-warehouse UK (d)—Delivered BM—black masterbatch CBM—cold, black masterbatch CNP—cold, non-pigmented CNS—cold, non-staining COE—cold, oil extended COELC—cold, oil extended, light coloured CO/BM—cold, oil/black masterbatch CPOE—cold, pigmented, oil extended CRE—cold, rosin extended dw—Dry weight HN—high nitrile HNP—high nitrile, powder HP—hot, pigmented HS—high styrene LMW—low molecular weight MHN—medium high nitrile MLN—medium low nitrile MMW—medium molecular weight MN—medium nitrile NS—non-staining TS—total solids

SBR TYPES AND HIGH-STYRENE RUBBER

Ameripol (Goodrich Gulf) (e-qdp)
(min., 70,000-lb. lots)

1000 Hot, Non-Oil	23.10
1001 ,, ,,	23.10
1002 ,, ,,	23.34
1006 ,, ,,	23.34
1007 ,, ,,	23.34
1009 ,, ,,	23.71
1011 ,, ,,	23.71
1012 ,, ,,	23.24
1013 ,, ,,	23.94
1500 Cold, Non-Oil	23.10
1501 ,, ,,	23.10
1502 ,, ,,	23.10
1703 COE, 25% oil	*20.31
1705 ,, ,, ,,	*20.07
1707 ,,37.5% ,,	*18.89
1708 ,, ,, ,,	*18.89
1710 ,, ,, ,,	*18.66
1712 ,, ,, ,,	*18.66

*Under 70,000 lb., min. 600 lb.

ASRC (American Synthetic Rubber Corpn.) (cifUKdp*)
(carloads lots of 30,000 lb.)

1000 Hot, Non-Oil	23.99
1001 ,, ,,	23.99
1004 ,, ,,	23.99
1006 ,, ,,	23.99
1009 ,, ,,	24.61
1018 ,, ,,	26.74
1019 ,, ,,	26.26
1500 Cold, Non-Oil	23.99
1502 ,, ,,	23.99
1503 ,, ,,	26.02
3110 ,, ,,	25.78
1703 COE	20.69
1708 ,,	19.27

*US/£ conversion rate $2.80

Cariflex (Shell Chemical Company) (e-sUK)

S-1000 Hot	22.25
S-1002 ,,	23.375
S-1006 ,,	22.25
S-1009 ,,	24.0
S-1011 ,,	24.0
S-1013 ,,	24.0
S-1100 Hot/black	19.75
S-1500Cold	22.25
S-1502 ,,	22.25
S-1509 ,,	22.25
S-1600 Cold/black	19.625
S-1602 ,, ,,	19.625
S-1605 ,, ,,	19.375
S-1703 COE	20.25
S-1707 ,,	18.0
S-1709 ,,	17.75
S-1712 ,,	17.75
S-1803 COBM	17.875

FR-S (Firestone) (cifUKdp*)

1000 Hot	24.10
1001 ,,	24.10
1004 ,,	24.10
1006 ,,	24.10
1007 ,,	24.10
1500 Cold	24.10
1502 ,,	24.10
146 ,,	24.10
1703 Oil-Extended	20.00
1710 ,,	18.85
1712 ,,	18.85
123 ,,	19.187
155 ,,	18.5
173 ,,	20.00
178 ,,	19.10
184 ,,	18.85
1009 Specialty	24.75
1010 ,,	26.00
1012 ,,	24.25
1013 ,,	25.00
1014 ,,	28.10
1015 ,,	28.75
141 ,,	28.625
181 Specialty	24.10
182 ,,	25.00
158 ,,	29.5

*US/£ conversion rate $2.80

International Synthetic Rubber Co. (d)

Intol 1500	22.5
Intol 1502	22.5
Intol 1006	22.5
Intol 1710	18.0
Intol 1712	18.0
Intol 1778	18.25
	(ex-wks TS)
Intol Latices R23/M23	22.25

Naugapol (Naugatuck Chemical International) (e-sUK)

1016	28.0
1018	28.5
1019	28.0
1022	30.75
1023	32.75
1503	27.75
1504	34.0
6101	26.25
6102	27.75
K-45	30.5
K-50	31.25
KO-50	29.0

Philprene (Phillips) (e-qdp*)

1000 Hot, Non-Pig	23.28
1001 ,, ,,	23.28
1006 ,, ,,	23.28
1009 ,, ,,	24.69
1010 ,, ,,	25.86
1018 ,, ,,	26.80
1019 ,, ,,	26.33
1100 HP	19.65
1104 ,,	19.28
1500 CNP	23.28
1502 ,,	23.28
1503 ,,	26.10
1601 CP	19.56
1605 ,,	19.28
1703 COE	20.23
1706 ,,	19.94
1708 ,,	18.82
1712 ,,	18.58
1803 CPOE	17.78
1805 ,,	15.99

*US/£ conversion rate $2.81½

Plioflex (Goodyear) (ex-wUK)

1006 HNP	22.25
1500 CNP	22.25
1502 ,,	22.25
1507 ,,	22.25
1508 ,,	22.25
1006 S	22.75
1703 COE	19.25
1710 ,,	17.75
1712 ,,	17.75
1773 COELC	19.25
1778 ,,	18.0
B—6	27.5
B—5	28.0

Polysar (Polymer UK) (e-sUK)

S Hot	22.25
S-630 Hot	22.25
Kryflex 200 Cold	23.5
Krylene	22.25
Krylene NS	22.25
Krynol 651 COE	17.75
Krynol 652 ,,	18.0
S-X 371 Process Aid	24.0

SBR LATICES

Copo (Copolymer) (cifUKdp)
(10-ton lots)

2101 (dw)	46.30
X-765 ,,	40.80
X-800 ,,	37.20
2102 ,,	38.00
2105 ,,	38.00

Naugatex (Naugatuck Chemical International) (ex-wUK)

J8174	39.5
2000	40.0
2001	40.0
2002	40.0
2006	48.5
2105	40.0
2107	40.0
2108	42.25
2711	39.75
2714	39.75
2733	40.25
2734	40.25
2740	45.25
J8535	38.75
2113	39.25

Pliolite Rubber (Goodyear) (d)

2000	40

Latex

2001 (dw)	40
2104 ,,	40
2105 ,,	40
2108 ,,	40
5350 ,,	40

Pliolite Resin (Goodyear) (d)

101A (dw)	44
150 ,,	50
151 ,,	35
160 ,,	50
170 ,,	50

Hycar (B. F. Goodrich) (ddp)

2507 (HS) dw	48

Polysar (Polymer UK) (e-sUK)

Latex, type IV	32.5 TS
Latex, type 722	31.75 TS
(Non-returnable 45-gallon drums)	
	(e-i)
Latex, type 722	28.75 TS
(bulk quantities)	

International Synthetic Rubber Co. (ex-wks)

Intol Latex R23	22
Intol Latex M23	22

Dylex (Koppers Int. CA) (fas)

K-42A	31.6
K-52	31.6
K-31	31.6
K-900	31.6

ACRYLONITRILE TYPES

Butaprene N (Firestone) (cifUKdp)

NL	52.5
NAA	56.25
NF	51.5
NXM	60.18

Chemigum (e-s)

N—1	75
N—3A	52
N—5	52
N—6G	45
N—7	45
N—8	45
N600X	45

Hycar (British Geon) (UKd)
(500-lb. lots and over)

1001 High Nitrile Hot	52
1041 ,, ,, Cold	52
1002 MHN Hot	45
1042 ,, Cold	45

Hycar (B. F. Goodrich) (ddp)
(500-lb. lots and over)

1411 HNP	66
1432 MHN (crumb)	64
1072 ,, (carboxyl)	66
1312 ,, (liquid)	55
1043 MLN	51
1014 Low Nitrile	61

I.C.I. (min., 5-cwt. lots) (UKd)

Butakon A-4051 HN Ccld	52
Butakon A-3051 MN Cold	45
Butakon A-3002 ,, ,,	45

Paracril (US Rubber) (e-sUK)

18-80 Low Nitrile	61
AJ ,, ,,	50
B MLN	51
BJ ,,	51
BLT ,, Cold	51
BJLT ,, ,,	51
C MHN	59
CLT ,, Cold	59
CV ,, (crumb)	60
D High Nitrile	67
ALT	51
OZO	47

Polysar (Polymer UK) (d)

Krynac 800 MN	45
Krynac 802 LN	45
Krynac 803 MN (low Mooney)	45
Krynac 801 HN	52

ACRYLONITRILE LATICES

Butaprene N (Firestone) (cifUKdp)

N-300 (dw)	53
N-400 ,,	60.5

Chemigum Latex (Goodyear) (d)

200 (dw)	65
235 CHS ,,	60
236 ,,	60
245 B ,,	52
245 CHS ,,	52
246 ,,	52
247 ,,	52
248 ,,	52

Hycar (B. F. Goodrich) (ddp)
(dry weight, drum lots)

1551 High Nitrile	66
1552 MHN	57

Hycar (British Geon) (UKd)
(dry weight, 3 drums and over)

1561 High Nitrile	60
1571 ,, ,, (carboxyl)	60
1562 MHN	52
1577 ,, (modified)	52

Nitrex (Naugatuck Chemical International) (e-sUK)

J6849	56.75
2612	53.75
2616	63.0
2619	62.75
2620	55.5
2625	54.5
2625-A	54.5

ACRYLIC TYPES

Hycar (B. F. Goodrich) (ddp)

4021 Slab, 500 lb. and over	144
4501 Latex, dry weight	96

BUTYL TYPES

Esso (e-sUK)

Regular 035	21.75
Regular 150	21.75
Regular 215	21.75
Regular 217	21.75
Regular 218	21.75
Regular 325	21.75
Non-staining 065	22.75
Non-staining 165	22.75
Non-staining 265	22.75
Non-staining 267	22.75
Non-staining 268	22.75
Non-staining 365	22.75

Vistanex (Polyisobutylene) (e-qdp)

MS LMW	54
MH ,,	54
L-80 MMW	54
L-100 ,,	54
L-120 ,,	54
L-140 ,,	54

Polysar (Polymer UK) (e-sUK)

Butyl 100	21.75
Butyl 200	21.75
Butyl 300	21.75
Butyl 301 NS	21.75
Butyl 400	21.75
Butyl 101 NS	26.25
Butyl 402	22.5

Hycar (B. F. Goodrich) (ddp)
(500 lb. and over)

2202 Brominated	68

NEOPRENES

		(e-qdp)
W and WHV	(dwdel)	42.62
WRT	,,	48.37
WX	,,	44.62
GN	,,	44.62
GNA	,,	44.62
GRT and S	,,	45.62
AC	,,	57.125
KNR	,,	75.62
AC 'M' and 'S'	,,	57.125
CG	,,	57.125
AD	,,	57.125

Latices—Dry
(per lb. del, min., 50 lb.)

571	49.75
842A	49.75
572	51.25
601A	51.87
650	54.125
735	51.25
736	51.25
950	58.25
60	51.87
750	51.25
635	53.62

SILICONE RUBBERS

Midland Silicones
(500-lb. lots del)

Stocks	16s. 6d. to 35s.
Pastes	26s. to 35s.
Gums and base stock	36s. to 42s.
Cold-curing silicone rubber	20s. and 23s. 6d.

I.C.I. Silicones

Gums (40-lb. lots del)	39s. 6d.-47s.
Stocks (250 lb. lots del)	22s.-35s.
Pastes (1000 lb. lots del)	27s.6d.-35s.9d.

REINFORCING RESINS AND RUBBERS

I.C.I. (min., 2-ton lots) (UKd)

Butakon S-8551	36.5
Butakon S-7001	33.5

Hycar (B. F. Goodrich) (ddp)

2007 (powder)	42.5

Pliolite (Goodyear) (d)

S—6B	36.5

Polysar (Polymer UK) (e-sUK)

SS-250 HS (bale)	27.25
SS-250 ,, (flake)	27.5
Kryflex 252 HS	25.5

Cariflex (Shell) (e-sUK)

SP-103	28.0

Cyclite (Durham Raw Materials) 42

HYPALON

In 50-lb. bags del UK	71.62

Rubber Markets

LONDON

Activity in the London rubber market remained at a low level throughout the week but the recent firm trend has been maintained and a further all-round improvement in prices has been recorded. Confidence in the outlook for the commodity continued as the main reason for the persistent rise. Gains range from ¼d. to ⅜d. per lb. with the larger gains among the forward positions. Spot is ¼d. higher at 34⅞d. per lb.

Latest prices are as follows:

No. 1 RSS Spot: 34⅜d.-35d.

Settlement House:

May 34⅜d.-34⅞d.

June 34⅜d.-34⅜d.

July/September 34d.-34⅛d.

October/December 33⅜d.-33⅝d.

January/March 32⅜d.-32⅝d.

April/June 32⅛d.-32¼d.

No. 1 RSS cif basis ports:

April 35d.-35⅛d.

May 34⅜d.-35d.

Godown:

April 120¼ Straits cents nominal.

LATEX

Centrifuged latex per gallon in drums, seller, May 20s. 6d., cif European ports, Spot, 20s. 9d. Bulk, nominal 19s. 10d. value. Creamed, seller, May 20s. 0d. Normal, seller, May 15s. 8d.

AMSTERDAM

The Amsterdam rubber market ruled as follows on March 28:

	Guilders per kilo	
No. 1 RMA	March 28	Previous
March	Deleted	3.36
April	3.36	3.36
May	3.36	3.36
June	3.36	3.36
April/June	3.36	3.36
July	3.26	3.26
August	3.26	—

Sales: Nil. Tendency: Quiet.

DJAKARTA

The market was closed on March 28 and 29 due to a religious holiday. Previous prices, rupiahs per kilo:

Spot No. 1 Priok	39.50b
Spot No. 2 Priok	38.50b
Spot No. 3 Priok	37.50b
No. 1 fine pale crepe, spot ..	37.50b

CEYLON

No. 1 RSS

The price of No. 1 RSS spot at Colombo on March 28 was 139¼ (139½) Ceylon cents per lb.

SINGAPORE

The market ruled very quiet throughout the morning of March 29. Interest was confined to No. 1 RSS. Lower sheets were neglected and except for No. 2 RSS discounts widened slightly. Factories were quiet. The afternoon market continued quiet and little trading was done. No. 1 for April delivery buyers was half a cent above the previous final level at 120½ Malayan cents per lb.

	Straits cents per lb., fob Malayan ports to open ports	
	March 29	Previous Close
No. 1 RSS, Apr.	120½–120⅝	120 –120¼
May	120¼–120⅜	119⅞–119⅞
No. 2 RSS, Apr.	118⅛–119½	118¼–118⅜
No. 3 RSS, Apr.	116¼–117⅛n	116 –116⅜
No. 4 RSS, Apr.	114½–115⅛n	114¼–115¼
No. 5 RSS, Apr.	111½–112⅛n	111½–112½
No. 1 Spot ..	120⅛–120⅞n	120 –120⅛
No. 3 blanket, thick remilled, April ..	113½–115½	113½–114½
No. 1 fine pale crepe, April ..	131½–133½	132½–134½
2x thin brown crepe, April ..	113¾–114⅞	113½–115

Tone: Very quiet

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 231.00d. nominal per gallon.

BANGKOK

No. 1 RSS

The price of No. 1 RSS at Bangkok on March 28 was 37.50 (37.50) US cents per lb.

NEW YORK

The New York rubber market ruled as under on March 28:

DEALERS' PRICES

	US cents per lb.	
	March 28	Previous
No. 1 RSS, April	40½b–40⅝a	40½b–40¾a
May	40¼b–40½a	40¼b–40½a
No. 2 RSS, April	40⅜n	40⅜n
May	40⅜n	40⅜n
No. 3 RSS, April	40⅜b–40⅝a	40⅜b–40⅝a
May	40¼b–40⅜a	40¼b–40⅜a
No. 1 RSS, Spot	40⅜n	40⅜n
No. 3 amber blanket crepe, June	39⅜n	39⅜n
No. 1 latex thin crepe, April ..	45½n	45½n
No. 1 latex thick crepe, April ..	44½n	44½n

FUTURES—REX CONTRACT

	March 28	Prev. Close
March	40.45t	40.25b–40.85a
May	40.49– 40.46t	40.50t
July ..	39.68b–39.70a	39.66t
September	39.15b–39.20a	39.10t
November	38.60b–38.70a	38.50b–38.70a
January	38.10b–38.35a	38.00b–38.10a
March ..	37.20b–37.45a	37.00b–37.30a

Sales: 22. Tone: Steady.

Rubber futures were steady in quiet featureless trading. Physical rubber was also quiet and steady. Traders reported little interest in the market.

Mr Thomas H. Miller has been appointed a director of Merlimau Pegoh and of Dennistown Rubber Estates.

IRI PREVIEW

Young People's Lecture

The Burton-on-Trent section has arranged a 'Young People's Lecture' for Thursday April 7 at 2.30 p.m. It will be given by Professor C. E. H. Bawn, of Liverpool University, in the Boys' Grammar School, Burton-on-Trent. An exhibition of rubber products will be run in conjunction with the lecture at which about 500 children are expected to attend.

Fifteenth Foundation Lecture

The title of the foundation lecture which will be delivered by Mr Maldwyn Jones at the Library Theatre, Manchester, on Friday May 20 will be 'High Polymers. The Story of an Age in Principle and Practice.'

Gordon Conference

The Gordon Research Conference on Elastomers will be held from June 20-24 at the Colby Junior College, New London, New Hampshire, USA. Those wishing to attend should apply to the Director for the standard application form at least two months prior to the date of the Conference.

Spring in Sweden

Members of the Institution are invited to attend a two-day meeting organized by the Swedish Institute of Rubber Technology. The meeting will be held from May 12-13 in the Grand Hotel, Saltsjobaden, and the subject will be 'Trends in SBR.' Enrolment forms from Mr Chr. Nordenskjold, Hamngatan 12, P.O. Box 7310, Stockholm.

THE AMSTEL CLUB

A number of leading financial houses in Western Europe have formed an organization known as 'The Amstel Club.' This works on a system of bilateral agreements: a finance house in one country arranges on behalf of an exporter for an importer to receive medium-term credit finance in his own country.

United Dominions Trust, as the United Kingdom member, has now issued a booklet which lists member companies and describes procedure by which credit can be arranged. 'The manufacturer is thus relieved,' says the UDT, 'of the task of either giving credit to his customers or seeking it on his behalf. No longer need he tie up capital which he needs for his own business or go to the trouble and expense of arranging credit facilities. These new arrangements enable him to sell for cash.'

Industry INTELLIGENCE

Technical Data

Regal Blacks

Regal blacks are produced from oil by a new and exclusive process developed by the Cabot Research and Development Department. Three grades are in commercial production by Godfrey L. Cabot Inc. in the USA, namely, Regal 300, Regal 600 and Regal SRF, while Regal 300 and 600 are also in production at the Stanlow, Cheshire, plant of Cabot Carbon Ltd. Information on the properties of these new blacks and their behaviour in natural and synthetic rubbers is given in Cabot Technical Reports RG-103, RG-104 and RG-105, by T. D. Bolt, available in the UK from Cabot Carbon Ltd., 62 Brompton Road, London, S.W.3.

Regal 300. This black provides rubber properties similar to channel black but with a faster curing rate approaching that of HAF black. It is recommended as a lower cost replacement for channel black. Report RG-103 contains results of two groups of tests with Regal 300. In the first group, both laboratory and road tests were made comparing Regal 300 with (a) EPC black in natural rubber passenger tyre treads, (b) EPC and HAF blacks in natural rubber truck tyre treads, and (c) HAF black in oil-extended SBR passenger tyre treads. In the second group, laboratory tests were made comparing Regal 300 with (d) EPC black in natural rubber off-the-road truck tyre treads, (e) EPC, FEF and HAF blacks in natural rubber truck tyre outer ply, (f) EPC and GPF blacks in natural rubber/reclaim tyre carcass stocks, (g) EPC black in nitrile rubber, (h) EPC black in Neoprene Type W, (i) EPC black in butyl rubber and (j) EPC and HAF blacks in SBR 1000.

Regal 600. This black is recommended for low hardness, quiet ride passenger tyre treads and tread rubber with the excellent resistance to wear of ISAF black. Report RG-104 contains comparisons of Regal 600 with (a) ISAF black in oil-extended SBR passenger tyre treads and (b) MPC and HAF blacks in natural rubber truck tyre treads. Results of both laboratory and road tests are reported. Regal 600 was also compared in laboratory tests with (c) ISAF black in oil-extended SBR at different loadings of black, (d) EPC, HAF and ISAF blacks in SBR 1000, (d) EPC black in natural rubber off-the-road truck tyre treads, and (e) EPC, HAF and ISAF in a natural rubber compound.

Regal SRF. This black provides the processing characteristics and physical properties in rubber of gas-produced SRF black. Report RG-105 contains a series of laboratory comparisons between Regal SRF and a gas-produced SRF (Sterling S) in the following compounds: (a) natural rubber tyre carcass, (b) natural rubber/reclaim passenger tyre carcass, (c) Neoprene Type W cable jacket, (d) natural rubber, (e) SBR 1000 at different loadings of black, (f) Neoprene Type W, (g) butyl rubber at two loadings of black, and (h) nitrile rubber.

Reomol RIG

Reomol RIG (formerly called Reomol DV7) is a low-viscosity plasticizer specially suitable for use in PVC regisol formulations for rotational casting and in PVC plastisols for coating metal by spraying. These applications of Reomol RIG are described in Technical Data Sheet No. 15, issued by The Geigy Co. Ltd., Rhodes, Middleton, Manchester.

In the rotational casting mould which is totally enclosed, a volatile diluent is unsuitable as it could not be driven off. A low-viscosity plasticizer must be used; Reomol RIG meets the requirements of such a plasticizer and two formulations containing it are given. The development of solvent-free PVC plastisols for spray-coating of metals is still in its early stages but general guidance on the procedure is given together with a suggested formulation. This method of applying plastisols is likely to be of interest also for the coating of non-metals where normal paste spreading would be difficult, *e.g.* the coating of polyurethane foam with a PVC skin. Data are given for the properties of (a) Reomol RIG and Reomol D79P and (b) PVC compounds containing these plasticizers.

Machines, Materials and Equipment

Burning Its Own Smoke

Boston Marine and General Engineering Co. Ltd., a subsidiary of Midland Industries Ltd., Wolverhampton, are now manufacturing a completely new incinerator which, they claim, consumes its own smoke and will destroy without smoke or smell a wide range of waste materials. It complies with the requirements of the 1956 Clean Air Act.

At the base of a chimney is mounted a small oil burner, and a forced draught fan. The air from this passes through a special diffuser and supports the combustion of the ignition oil flame and air to mix with the smoke, which burns continuously within the inner stack. The chimney is designed as a carburettor and consists essentially of two concentric cylinders. Air passes into the annular space and by thermocycle passes upwards, where it enters the chimney. This highly preheated air then mixes with the remainder of the smoke and complete combustion of the gases is assured.

Space heating is achieved by a high-powered fan blowing air through the heat exchanger. The gases from the furnace pass through the inner space imparting their heat to the air before passing into the chimney and smoke eliminating chamber.

New Laminating Machine

A new laminating machine, which claims to reduce the retail price of hard surfaced, decorative wall, ceiling and roof boards by one-third to a half of current UK prices, is now being manufactured by Mather and Platt Ltd., Manchester 10, under licence. Known as the Contropress, the machine applies polyester and vinyl films continuously without resorting to the use of static presses; films pre-printed with veneer or other effects can be applied to plywood, blockwood, chipboard, asbestos board, hard-board, and fibreboard for indoor or outdoor use. Shuttering boards for use on concrete structures, skin panels for foam laminates and cigarette proof boards, can also be produced by laminating foils or vinyl films to cheap base boards.

Sheet metal can be laminated with film after the appropriate cleansing and etching procedures have been carried out, and recent reports from USA are said to indicate that research programmes carried out at the Litzler laboratories reveal the Contropress to be capable of producing 'rigidized metal' by laminating thin aluminium, copper or stainless steel to plywood.

New Publications

Turner Asbestos

Turner Brothers Asbestos Co. Ltd., who were probably the first firm to spin asbestos yarn by machinery—as long ago as 1880—have produced a brochure about the work of the company. It describes their Rochdale factory and their new factory at Hindley Green, where brake linings and rubber and PVC belting is manufactured.

Printing on Polythene

Proper treating for printability is the first subject dealt with in a new booklet from US Industrial Chemicals Co., 99 Park Avenue, New York 16. Different types of treating, such as chemical, flame and electronic are discussed.

This is followed by a section dealing with all the known methods for printing polythene. Short explanations are given for flexographic, rotogravure, silk screen, transfer ('roll leaf stamping'), and offset printing. Embossing is briefly described.

Inks, pigments, additives and solvents are dealt with, and the brochure is rounded off with an explanation of the methods generally used to test ink performance and a glossary.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

Leicester Section.—Thursday April 7 at the Bell Hotel, Leicester, at 7.30 p.m. Annual general meeting.

Merseyside Section.—Monday April 11 at the Exchange Hotel, Liverpool, at 7.15 p.m. Annual general meeting and film evening.

Manchester Section. — Monday April 11 at 6.45 p.m. at the Engineer's Club, Manchester. Annual general meeting followed by hotpot supper.

Midland Section.—Monday April 11 at the Goodyear Pavilion, Wolverhampton, at 6.45 p.m. 'Moulded Footwear' by C. E. Webb (C. and J. Clark Ltd.).

Preston Section.—Monday April 11 at BTR Industries Social Club, Farington, Preston, at 7.15 p.m. Annual general meeting, followed by two films: 'People and Plastics' and 'The Nature of Plastics' (Bakelite Ltd.).

PLASTICS INSTITUTE

London Section.—Tuesday April 5 at the Wellcome Building, 183/193 Euston Road, N.W.1, at 6.30 p.m. Chairman's lecture: 'Where Plastics are Going,' by J. Gadsby (I.C.I.).

Yorkshire Section. — Wednesday April 6 at St. Mark's House, 186 Woodside Lane, Leeds 2, at 7.15 p.m. Annual general meeting.

PTFE Sleeving

Thin wall electrical sleeving in PTFE is being manufactured by Polypenco Ltd., Welwyn Garden City, in 26 different sizes from .336in. inside diameter by .015in. wall thickness to .013in. inside diameter by .008in. wall thickness. These sizes, which cover the awg range and are suitable for most swg sizes, are supplied in long lengths coiled on standard reels for ease of handling.

Produced from 'Fluon' or 'Teflon' polytetrafluoroethylene, Polypenco electrical sleeving has the following properties permitting its use in miniature assemblies, thus saving weight and space: Minimum dielectric strength 750 volts/mil., low dielectric constant of 2.0, high surface resistivity above 10^{12}ohms., suitable for use in radar frequency ranges, unaffected by heat and moisture, non-flammable, chemically inert and resistant to fungus and sunlight. The range is in ten colours for ease of identification.

A new company, Palmer's Reinforced Plastics, has moulded the hull and superstructure of the Palmcraft, £1.300 two berth cabin cruiser. Other projects are at the planning stage.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

PERLON (786,388) Synthetic fibrous materials for packing (jointing), stopping or insulating; and plastics included in Class 17 in the form of rods or filaments. (786,389) Imitation leathers and articles included in Class 18 made therefrom; and trunks, travelling bags, net bags for shopping, umbrellas, fitted cases for umbrellas, and parasols. (786,390) Combs and sponges, all of plastics; small domestic utensils and containers of plastics or of synthetic textile materials; brushes included in Class 21; materials prepared for brushmaking; hand besoms; and non-electric instruments and material included in Class 21 for cleaning purposes. (786,392) Yarns and threads, all of textile materials. (786,391) All goods included in Class 22. Perlon - Warenzeichenverband Eingetragener Verein, Liebigstrasse 51, Frankfurt/Main, Germany. Address for service is c/o Carpmaels and Ransford, 24 Southampton Buildings, Chancery Lane, London, W.C.2. (Classes 17, 18, 21, 23, 22; February 9 1960).

ALARENE (795,107) Raw fibrous textile materials. Courtaulds Ltd., 16 St. Martin's-le-Grand, London, E.C.1. (Class 22; February 9 1960).

perlon

(786,393). Yarns and threads, all of textile materials. (786,397) Complete articles of clothing, but not including stockings or socks, or any goods of the same description as stockings or socks. (786,399) Floor coverings and non-textile wall hangings, all made of synthetic fibrous materials. Perlon - Warenzeichenverband Eingetragener Verein, Liebigstrasse 51, Frankfurt/Main, Germany. Address for service is c/o Carpmaels and Ransford, 24 Southampton Buildings, Chancery Lane, London, W.C.2. (Classes 23, 25, 27; February 9 1960).

NEW COMPANIES

Thames Estuary Plastics Ltd. (651,454).—March 4. Capital: £100 in £1 shares. The directors are: David Watkins, Flat 5, Marlborough Court, Woodfield Road, Leigh-on-Sea; George H. Watkins, 27 Rockleigh Avenue, Leigh-on-Sea. Regd. office: 289 Kiln Road Thundersley, Essex.

Polyfreem Ltd. (651,434).—March 4. Capital: £1,000 in £1 shares. To carry on the business of manufacturers of and dealers in plastic foam and rubber foam sheeting and cushions, etc. The permanent directors are: Alfred C. Freeman and Reginald K. Freeman, both of 897A Christchurch Road, Boscombe, Bournemouth; L. W. File, 280 Old Christchurch Road, Bournemouth; Charles R. Law, 4 St. Annes Avenue, W. Southbourne, Bournemouth. Regd. office: 897 Christchurch Road, Boscombe, Bournemouth.

D. A. Payne Ltd. (651,486).—March 4. Capital: £1,000 in £1 shares. To carry on the business of buyers and sellers of and dealers in wood, hardboard, plastics and any other materials; cabinet makers, etc. The directors are Douglas A. Payne, 3 Holders Lane, Moseley, Birmingham, 13; Mrs. Susan E. Payne, 3 Holders Lane, Moseley, Birmingham, 13. Regd. office: 153 Wolverhampton Street, Dudley.

Fibre Glass Mouldings (Newhaven) Ltd. (651,301).—March 3. Capital: £1,000 in £1 shares. The directors are: Roy Hall, 35 Heathfield Road, Seaford, Sussex and William Steward, 11 Channel View Road, Brighton 7. Regd. office: 43 Church Road, Hove.

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on March 16, 1960

E. I. Du Pont De Nemours and Co. Production of shaped articles, particularly filaments, of synthetic polymers by melt extrusion processes. 830,442.

W. C. Heraeus G.m.b.H. Spinning nozzles for the production of artificial filaments. 830,653.

Courtaulds Ltd. Polyacrylonitrile solutions. 830,750.

H. Gruber. Device for the manufacture of footwear from gelatinizable plastics. 830,269.

Dunlop Rubber Co. Ltd. Electrically-operated fluid-pressure braking system. 830,270.

British Industrial Plastics Ltd. Copolymers of alkenylated urea-aldehyde resins and ethylenically unsaturated compounds. 830,751.

Ciba Ltd. Dry preparations capable of yielding cation-active melamine resin solutions by dissolution in water. 830,620.

Imperial Chemical Industries Ltd. Polymerization catalysts. 830,424.

Avon India Rubber Co. Ltd. Central buffing and draft gear. 830,459.

Phillips Petroleum Co. Olefin polymerization catalyst and process. 830,247.

Ford Motor Co. Ltd. Moulded mould, low temperature plastic injection process. 830,250.

Goodyear Tire and Rubber Co. Rolling lobe type air spring and method of manufacture. 830,283.

Goodyear Tire and Rubber Co. Disc type brake with load equalizing pressure applying members. 830,286.

British Insulated Callender's Cables Ltd. Electric cable couplers. 830,675.

Imperial Chemical Industries Ltd. Interpolyamides. 830,676.

Sun Oil Co Polymerization of alpha-olefins. 830,533.

H. Perlinger and H. Richter (trading as Perlinger and Richter Primatex). Method of and apparatus for crimping wholly or partially synthetic filaments or strands of filaments. 830,702.

Firestone Tire and Rubber Co. Control device for vehicle suspension. 830,564.

Goodyear Tire and Rubber Co. Skid warning system. 830,719.

Midland Silicones Ltd. Coating compositions. 830,310.

E. I. Du Pont De Nemours and Co. Coated films and their production. 830,311.

Changes of Name

Campbell Mixers Ltd. (621,725). Consulting engineers to the chemical, petroleum and plastic trades, etc. 17 Brazennose Street, Manchester, 2.—Name changed to Colin Campbell Mixers Ltd., on October 22 1959.

Inglis (Blackheath) Ltd. (638,380). Indiarubber, asbestos and general merchants, etc., 72 Waddington Way, S.E.19.—Name changed to Todrick Tapp and Co. Ltd. on October 15 1959.

Plastic Materials (Export Agency) Ltd. (402,187). 3 Red Place, Grosvenor Square, W.1.—Name changed to Leeph Property Co. Ltd., on November 9 1959.

Aquacoats Ltd. (602,855). Manufacturers of and dealers in and waterproofers of fabrics, silks, etc, Room 25, 16 John Dalton Street, Manchester, 2.—Name changed to Jowin Co. Ltd., on October 30 1959.

Increases of Capital

Paxylon Plastics Ltd. (575,849). Wardle Street, Tunstall, Stoke-on-Trent.—Increased by £4,900 in £1 ordinary shares, beyond the registered capital of £100.

Henrietta Rubber Estate, Ltd. (120,750). London House, New London Street, E.C.3.—Increased by £550,000 in 2s. ordinary shares, beyond the registered capital of £200,000.

R·J·I·P· CLASSIFIED ADVERTISEMENTS

Classified Advertisements may be displayed under each heading at £3 per inch, single column. Write or phone for details.

APPOINTMENTS VACANT

6d. a word. Minimum 10/-. Box 2/-.

ADHESIVE technologist with experience of thermoplastic synthetic resin adhesives required for technical service department of leading resin manufacturers in the London area. Progressive appointment in expanding section. Pension and life assurance schemes in operation. —Please reply, giving details of age, qualifications and experience to RJ/AT, Box 184. (184)

EXPERIENCED sales correspondent required. The man envisaged is already qualified and handling general sales correspondence in busy office of a large manufacturer. The vacant post is adjacent to the East London area.—Fullest details of experience, salary required, age, etc., to Box 180. (180)

LABORATORY assistant, 20/30 years, required for old-established West of Scotland rubber factory; control and development work; experience rubber technology.—Applications, giving full details of age, education and qualifications to Box 176. (176)

MEDIUM-SIZED progressive rubber factory in the London area have a vacancy for a fully experienced rubber mill-room foreman. Applicants must be experienced in modern mill-room techniques, able to organize production on a 24-hour basis and control production staff. This is a senior staff appointment with a progressive salary and scope for advancement. Pension scheme.—Give full details of age, experience and present salary to Box 178. (178)

DU PONT
REG. U.S. PAT. OFF.

ELASTOMERS RESEARCH LABORATORY

Applications are invited for posts at this new and growing laboratory. The Laboratory provides technical service to the rubber industry in the U.K. and Europe and also carries out development work on new applications of Du Pont elastomers. Necessary qualifications for these posts are:—

A degree in science or rubber technology, experience in one or more of the following fields—elastomer adhesives, belting, elastomer paints, coated fabrics, latex products.

Knowledge of any European languages would form an additional qualification. The work is varied and stimulating; contact with U.K. and overseas rubber manufacturers forms an important part of the laboratory activities. A generous contributory pension scheme is in operation. Applications should be addressed to:—The Manager, Du Pont Co. (U.K.) Ltd., Elastomers Research Laboratory, Maylands Avenue, Hemel Hempstead, Herts. (174)

APPOINTMENTS VACANT

(continued)

MANAGER for moulding department in Hertfordshire. Experienced and used to full responsibility for labour control and maximum production. Excellent prospects for keen energetic applicant.—Apply Box 166. (166)

MEDIUM-SIZED progressive rubber factory in the London area have a vacancy for a fully experienced rubber moulding departmental foreman. Applicants must be experienced in mass-production techniques, able to organize production lines on a 24-hour basis and control labour. This is a senior staff appointment with a progressive salary and scope for advancement. Pension scheme.—Give full details of age, experience and present salary to Box 179. (179)

NATIONAL COLLEGE OF RUBBER TECHNOLOGY
Northern Polytechnic, Holloway, London, N.7.

Research assistant. Chemistry graduate required, to continue and extend a research project into the kinetics and mechanism of the reaction of sulphur monochloride with olefines. A suitably qualified candidate will be encouraged to take a higher degree. Salary approximately £600 per annum. Further particulars on application to the Head of the College. (182)

SENIOR sales technician required for new products. Responsible for seeking, initiating and assisting in the early development of rubber and plastic products suitable for a medium-sized plant. He will report up to board level. The work is interesting and although based in London, travel throughout the country will be necessary. Four figure salary. Pension scheme. Unless experienced please do not apply.—Full details of past experience, age, etc., to Box 181. (181)

TECHNICAL assistant required by large old-established company commencing the manufacture of plastic flooring in a new and modern factory situated in Essex. Sound knowledge of physical testing and process control of plastic flooring essential. There is considerable scope for a young man with enthusiasm and energy. A staff pension and life assurance scheme is in operation. Full details of qualifications, experience, age, salary, etc., to be submitted in strict confidence to the Plastic Divisional Manager, marked "Private and Confidential."—Box 158. (158)

TECHNOLOGIST of D.P.I. standard required for technical service work on PVC compounds and pastes. This is an interesting post for a man of about 25 from which further progress would be readily possible. Familiarity with the use of PVC in paste moulding/coating or injection moulding and extrusion is necessary. A pension and life assurance scheme operates in the company, to which applicants should write, giving relevant details.—RJ/VS, Vinatex Ltd., Devonshire Road, Carshalton, Surrey. (175)

ARTICLES FOR SALE (SECONDHAND)

6d. a word, Minimum 12/6 Box 2/-

BANBURY No. 11, jacketed with 250 h.p. drive. Bridge 84in. x 26in. mill with 150 h.p. drive. Intermix K4 with 110 h.p. drive. 60in. x 22in. Single-geared mill with 125 h.p. drive. Two Carter high-speed braiding machines. Available ex stock.—Reed Brothers (Engineering) Ltd., Replant Works, Woolwich Industrial Estate, London, S.E.18. Tel.: Woolwich 7611/6. (177)

MACHINERY FOR SALE

6d. a word. Minimum 12/6. Box 2/-.

NEW H. F. Welder with automatic material transport, for sale. For cutting and welding thermoplastic materials from the roll for wallets, albums, desk diaries, inflatable toys, dolls, fancy goods, etc. Working area of table 32½in. x 25½in. (equals max. electrode size). Pneumatic ram pressure 900lb. Daylight 4in. Generator capacity 3 kw. Ex Stock.—Illustration and details from F. J. Edwards Limited, 359 Euston Road, London, N.W.1, or 41 Water Street, Birmingham, 3. (169)

NEW, strongly constructed, steel mangles, weight 104lb.; 12in. x 4½in. dia. machined steel rollers, bronze bearings, suitable for a variety of small rolling uses; sketch available, £6 10s. each, carriage paid.—Woodfield and Turner Ltd., Burnley. Tel.: 78134. (172)

AGENCIES and REPRESENTATIVES

SALES REPRESENTATIVE

Well-established and progressive company operating from the Manchester area supplying raw materials to the rubber manufacturing industry, have a vacancy for a sales representative in the United Kingdom. Preference will be given to candidates with a technical background and/or previous experience in selling to the rubber industry. Present staff are aware of this advertisement and can apply independently. Applications should contain details of age, education, technical qualifications (if any), experience and salary required.—Box 168. (168)

ARTICLES WANTED

6d. a word. Minimum 12/6 Box 2/-.

TENSILE tester of the Scott type in reasonable working condition.—Box 183. (183)

ARTICLES WANTED

(continued)

PARDOES Rubber and Plastic Co. Ltd., for all types thermoplastic waste. Regular collections. Cash payments.—York Road, Blackheath, Birmingham. Blackheath 1904. (167)

URGENTLY required, six 24 spindle braiding machines by B. and F. Carter, 14in. haul off preferred. Must be in first-class condition and immediately available.—Send details to Box 170. (170)

WANTED. Second-hand 24in. x 12in single-roll rubber mill in good condition.—Full particulars to Antigen Limited, P.O. Box No. 32, High Wycome, Bucks. (171)

MISCELLANEOUS

6d. a word, Minimum 12/6 Box 2/-

MANUFACTURERS of roughing machines for rubber sheeting, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy, Ltd., Imperial Works, Menston, Nr. Leeds. (238R)

SCISSORS, up to 7in., ground and set by London cutlers established over 100 years; 48 hours postal service; 1/6 per pair.—J. A. Fowler, 18/22 Bell Street, Edgware Road, London, N.W.1. PAD 1491. (74R)

SILICONE rubber moulding. Capacity available for prototype and repetition work.—Esco (Rubber) Ltd., 2 Stothard Place, Bishopsgate, London, E.C.2. (170)

TWENTY tons Stearic acid, fine flake. 15 tons Greek Rosin 'N.' All prompt ex store London. Best offers.—Box 173. (173)

wants! ★★★★★★★★★★★★★★★★★★ ***MUST BE PREPAID***

Address Box Number replies to:
BOX NO.—, RUBBER JOURNAL AND INTERNATIONAL PLASTICS
Maclaren House, 131 Great Suffolk Street, London, S.E.1

W. B. STOCKER & CO LTD

Market Buildings

29 MINCING LANE, LONDON, E.C.3

Tel: Mansion House 7016/8 Grams: Vademecun, London

PLANTATION RUBBER

RUBBER LATEX

GUTTA PERCHA

SOLE CREPE

BALATA

MINERAL FILLERS

(Stockalite, Speswhite, Supreme, Devolite, etc.)

SPECIALLY PRODUCED FOR THE RUBBER TRADE

*Have you yet tried **Takolin 22**? If not, send for sample*

ENGLISH CLAYS LOVERING POCHIN & Co Ltd

ST. AUSTELL CORNWALL

Also at London, Manchester, Stoke, Edinburgh, Leominster and Willington-Quay-on-Tyne

RUBBER JOURNAL AND INTERNATIONAL PLASTICS

*The only Weekly serving the Rubber **and** Plastics Industries*

LEVIGATED NATURAL WHITING

Over 98% $CaCO_3$ and Hydraulically Classified

W. SINGLETON BIRCH & SONS LTD. (ESTD. 1815)

QUARRIES & WHITING WORKS: CHALK HILL, BARNETBY, LINCOLNSHIRE

Telephone: KIRMINGTON 215

SALES OFFICE: 251 Dialstone Lane, Stockport, Cheshire Telephone: STEpping Hill 3415

For Precision Moulds Consult

COLLINSON Engineering CO. LTD

17 BATH STREET, SYSTON LEICESTERSHIRE

Telephone: SYSTON 2838

Suppliers of all types of Single and Multi-Cavity Moulds for the Rubber Industry

---

LABORATORY MIXING MILL

This laboratory mixing mill is a typical example of specially designed rubber factory equipment which we offer. Full details on request.

Planters

THE PLANTERS ENGINEERING CO. LTD.

109 Uxbridge Rd., Ealing, London. W.5. Telephone: EALing 6062/3

Associated with ENTWISLE & GASS LTD.

We specialize in

MANUFACTURERS' SOLE CREPE CUTTINGS

(Pale, Brown, Coloured, Buffings, etc.)

DAMAGED CRUDE RUBBER

CRUDE RUBBER OFF-GRADES

SALVAGE CRUDE RUBBER

All grades of Crude Rubber can be supplied cut into thin slices or slabs

PROMPT DELIVERIES.

May we quote and send you samples?

BALE CUTTING FOR THE TRADE

We are also able to undertake the bale cutting of your own rubber, either NATURAL or SYNTHETIC.

Prompt service. Your enquiries welcomed.

L. STECHLER & CO. LTD.

Malvern Gardens, Canterbury Road

Kilburn, LONDON, N.W.6

'Phone: MAida Vale 0012-3-4

Cables: ELSTECHLER, LONDON

TELEX No. 21229

INDEX to ADVERTISERS

Page numbers below indicate the last occasion on which an advertisement appeared in this volume. Where the advertisement appeared on the covers or in the supplement, the figure in parentheses is the number of this issue

	Page
Allcock, J., & Sons Ltd.	vi (13)
Amalgamated Oxides (1939) Ltd.	iv
Anchor Chemical Co. Ltd.	Cover i
Anderson, Joseph, & Sons Ltd.	iii (12)
Armour Hess Chemicals Ltd.	iii (10)
Associated-Rediffusion Ltd.	475
Astor Boissalier & Lawrence Ltd.	209
Baker Perkins Ltd.	Cover iv (12)
Barfoot, T. W. & Webb, W. F.	iv (13)
Balgrave Industries (Exports) Ltd.	x (7)
Birch, Singleton, W., & Sons Ltd.	527
Boston Marine & General Eng. Co. Ltd.	431
Bridge, David, & Co. Ltd.	503
Bright, John, & Bros. Ltd.	Cover iii
British Electrical Development Association	277
British Geon Ltd.	vi (11)
British Nylon Spinners Ltd.	ii (12)
British Recovered Rubber Co. Ltd.	i
British Resin Products Ltd.	v (12)
British Titan Products Co. Ltd.	x (2)
Cabot Carbon Ltd.	507
Carter Bros. (Rochdale) Ltd.	iv
Cleggswood Oil Distillery Ltd.	491
Cohen, George, Sons & Co. Ltd.	454
Collison Engineering Co. Ltd.	527
Columbian International (Gt. Britain) Ltd.	i (13)
Consolidated Zinc Corporation (Sales) Ltd.	viii (12)
Crosfield, Joseph, & Sons, Ltd.	513
Croxton & Garry Ltd.	528
Cruickshank, R., Ltd.	iv (6)
Davis Plastics Ltd.	v (9)
Dietzel, Hugo	455
Dixon, T. H., & Co. Ltd.	i (11)
Dunlop Rubber Co. Ltd.	511
Du Pont Co. (United Kingdom) Ltd.	458
Durham Raw Materials Ltd.	viii (2)
Economist Intelligence Unit Ltd., The	409
English Clays Lovering Pochin & Co. Ltd.	526
Factice Research & Development Assoc.	239
Fawcett Preston & Co. Ltd.	iv (12)
Fellner & Ziegler GmbH.	—
Ferguson, A. O., & Co. Ltd.	477
Ferguson, James, & Sons Ltd.	483
Ferguson Shiers Ltd.	320
Fosmair Ltd.	519
Forrest, H., & Sons (E.P.M.) Ltd.	vi (9)
Gardner, Henry, & Co. Ltd.	401
General Utilities (Stockport) Ltd.	299
Goodyear Tyre & Rubber Co. Ltd.	467
Grantham Rubber Machinery Co. Ltd.	236
Greeff, R. W., & Co. Ltd.	xi (11)
Gresham & Craven Ltd.	vi (2)
Gummi und Asbest	455
Halsteads Engineers (Leyland) Ltd.	481
Hankin, Geo., & Co. Ltd.	vi
Hardman & Holden Ltd.	vi (8)
Hatcham Rubber Co. Ltd.	vi
Hay & Robertson Ltd.	431
Hercules Powder Co. Ltd.	iii (1)
Hilton, Wallace & Co. Ltd.	vi
Hubron Rubber Chemicals Ltd.	Cover iii (12)
Hughes & Hughes Ltd.	409
Hunt Heat Exchangers Ltd.	301
Iddon Bros. Ltd.	v (13)
Imperial Chemical Industries Ltd. (Billingham)	419
Imperial Chemical Industries Ltd. (Dyestuffs)	499
Imperial Chemical Industries Ltd. (Plastics—Butakon)	Cover ii
Institution of the Rubber Industry	355
International Corporation Ltd.	—
International Synthetic Rubber Co. Ltd.	viii
Ioco Ltd.	454
Kautschuk und Gummi	184
Kendell, T., & Sons Ltd.	401
Latex Engineering Co.	517
Lavino (London) Ltd.	i (12)
Leeds & Bradford Boiler Co. Ltd., The	viii (8)
Lonabarc Ltd.	ii
Lord, R., & Sons Ltd.	vi
Marsman, G. J.	409
McKechnie Bros. Ltd.	205
Maclaine, Watson & Co. Ltd.	iv (10)
Micafine Ltd.	vii
Monsanto Chemicals Ltd.	429
Muehlstein, H., & Co. (London) Ltd.	492
Muller, Max	101
Northwestern Rubber Co. Ltd.	vi (13)
Novadel Ltd	Cover iii (9)
Oldham, Thomas, Ltd.	vi (10)
Oswald & Duncan Ltd.	vii (13)
Philblack Ltd.	494
Phoenix Rubber Co. Ltd.	505
Planters Engineering Co. Ltd., The	527
Polymer (United Kingdom) Ltd.	381
Preston Tyre Fabric Manufacturing Co. Ltd.	vii (13)
Price's (Bromborough) Ltd.	385
Pullen, James H., (1942) Ltd.	ii
Reed Bros. (Eng.) Ltd.	483
Revue Generale du Caoutchouc	335
Rhein-Chemie GmbH.	v (10)
Robinson Bros. Ltd.	x (12)
Robinson, Joseph, & Co. Ltd.	449
Rotunda Ltd.	313
Rubber Age (New York) Ltd.	vii (9)
Rubber Latex Ltd.	517
Rubber Regenerating Co. Ltd., The	Cover iv
Shaw, Francis, & Co. Ltd.	iii
Shell International Chemical Co. Ltd.	389
Shell Mex & B.P. Ltd.	—
Smith, Alfred, Ltd.	v
Smith, Wilfrid, Ltd.	477
Sondes Place Research Laboratories Ltd.	vi (12)
Squire, Frederick, Ltd.	493
Stechler, L., & Co. Ltd.	527
Steel, J. M., & Co. Ltd.	Cover iii (11)
Steele & Cowlishaw Ltd.	335
Stocker, W. B., & Co. Ltd.	526
Stott, James, Ltd.	ii (13)
Sutcliffe Speakman & Co. Ltd.	387
Swinnerton, S. & J. H., Ltd.	408
Tanner Bros. (Greenfield) Ltd.	Cover iii (10)
Union Carbide Ltd.	viii (12)
United Norit Sales Corporation Ltd.	320
Universal Oil Co. Ltd.	463
Universal Oil Products Co.	470, 471
Vulcan Equipment Co. Ltd.	89
Wallace, H. W., & Co. Ltd.	xiii (11)
Wallis Engineering Co.	—
Welwyn Tool Co. Ltd.	491
Wiggins, Teape Group, The	45
Witco Chemical Co. Ltd.	519
Zama Ltd.	xi (11

Full **MAGLITE** Range of Merck's **MAGNESIUM OXIDES**

NOW AVAILABLE FROM STOCK

Technical literature and samples available from

CROXTON & GARRY LIMITED

16-18 High Street, Kingston-upon-Thames, Surrey

Telephone: KINgston 9444 (4 lines)

Sole U.K. agents for Merck and Co. Inc., Rahway, New Jersey

COTTON AND SYNTHETIC FABRICS FOR THE RUBBER, ELECTRICAL AND CHEMICAL TRADES

John Bright, M.P.
1811-1889

John Bright & Brothers Ltd.

SPINNERS · DOUBLERS · MANUFACTURERS

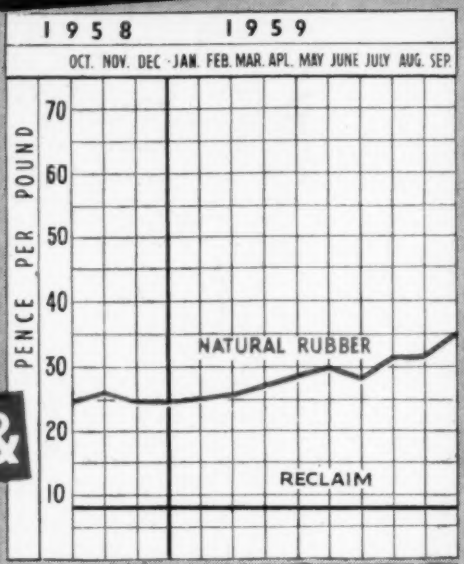
Rochdale

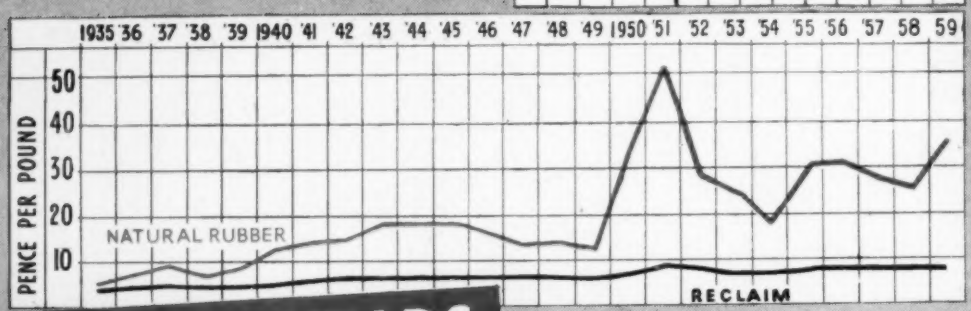
TELEPHONE: ROCHDALE 4141 (5 LINES) TELEGRAMS "BRIGHTS" ROCHDALE

ESTABLISHED 1809

RECLAIM FOR PRICE STABILITY

OVER THE MONTHS &





OVER THE YEARS

RECLAIM serves the Rubber Industry as its best price stabiliser.
In addition to reducing costs it offers many other technical advantages.

Also suppliers of: DISPERSIONS, RUBBER LABELS, ACCELERATORS, ANTIOXIDANTS, PARACRIL RUBBERS, SYNTHETIC RUBBERS AND RESINS.

CONSULT... THE RUBBER REGENERATING Co. LTD.

TRAFFORD PARK · MANCHESTER · 17

TELEPHONES: Trafford Park 1424/8 TELEGRAMS: "Regenerate" CODE: Western Union Telegraph, Universal Edition

Printed in Great Britain by F. J. PARSONS, Ltd., London and Hastings, and published by the Proprietors, MACLAREN & SONS, LTD., Maclaren House, 131 Great Suffolk Street, London, S.E.1